AUG 27 1923

Railway Age

SECOND HALF OF 1923—No. 8 NEW YORK—AUGUST 25, 1923—CHICAGO SIXTY-EIGHTH YEAR

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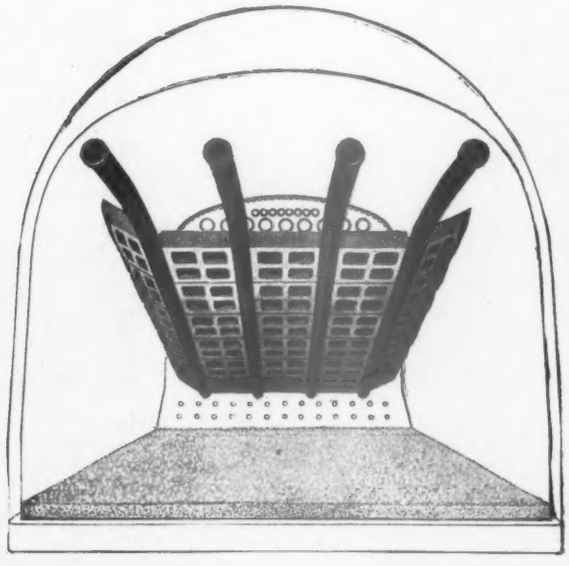

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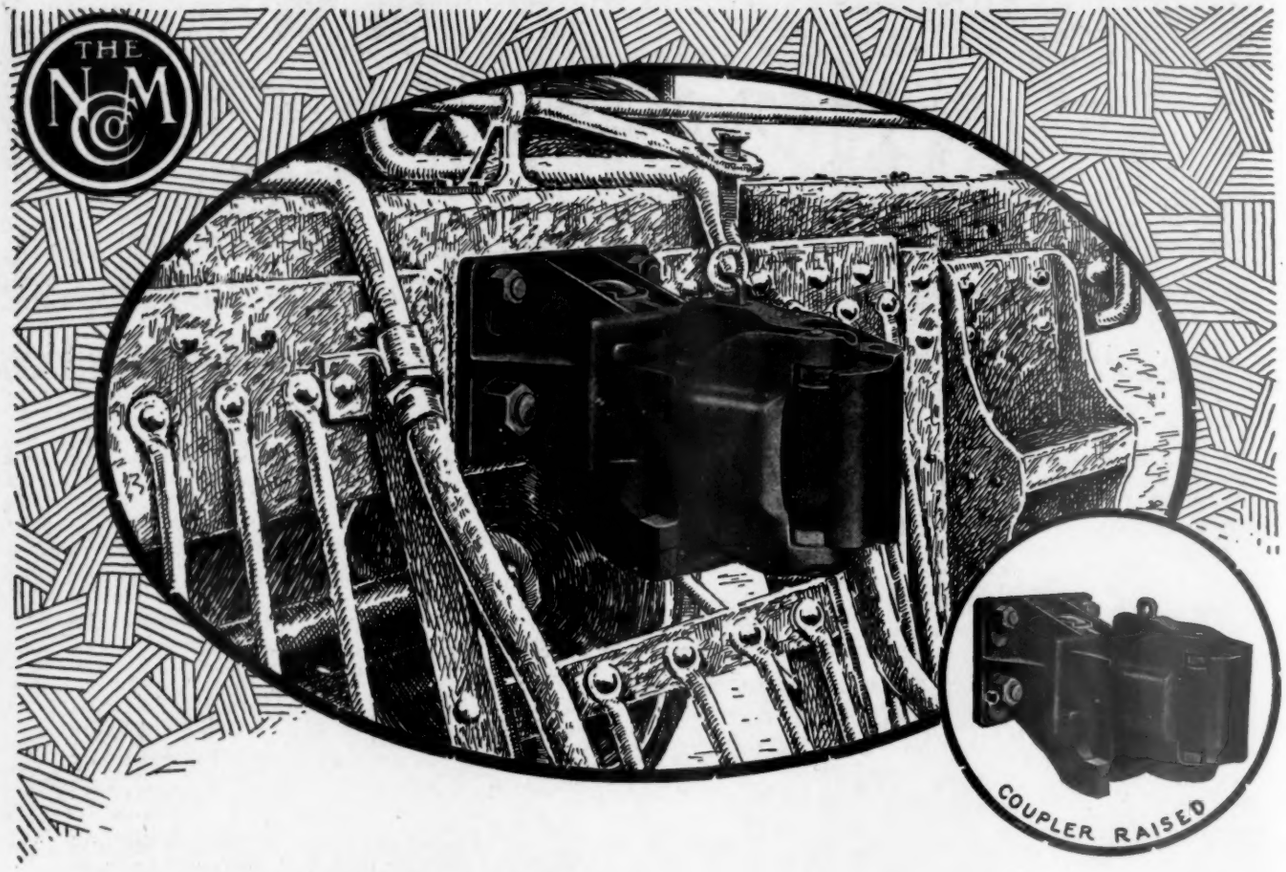

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EDITORIAL

Railway Age

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Provide Adequate Clerical Assistance

Construction projects having for their object the provision of additional trackage, may be divided into two stages—first, the building of the roadbed; second, the laying of the tracks and the finishing of the work ready for use. The first stage is primarily one of engineering. It is concerned primarily with providing the grading and masonry contractors with lines, grades, etc., the supervision of their work, and the collecting of necessary data for monthly estimates. The second stage relates more largely to business administration. The actual work is done more largely with company forces and involves an enormous volume of detail in supplying and delivering the needed material, in dealing with other departments and in effecting arrangements for turning the completed work over to the operating forces. As a result the construction engineer is responsible for a large amount of clerical routine to which he must give his personal attention unless he is provided with an adequate force of competent office help; it is an unfortunate fact that many construction officers are compelled to sacrifice field supervision in order that their office work may be done. Construction work cannot be conducted effectively nor can it be completed expeditiously unless the man in responsible charge has his work so organized that he is enabled to spend a maximum amount of his time out on the job. The considerations of economy and effectiveness will best be met by insuring that he is supplied with an adequate force of office engineers, material clerks, and other clerical help, to see that the daily routine will be completed with the minimum of his time away from the field work. This was never more true than at present when much of the construction work is in the final or completion stage.

The Art of Train Operation

Strong moral character in the train-masters (and other officers) with faithfulness in small details on the part of conductors, enginemen and their subordinates are the two most notable needs of the present day in the train service of American railroads. This is a fair summary of the conclusions which one will naturally reach after reading the article by Harry W. Forman, printed in this issue, in conjunction with the two previous articles to which he refers. To the well-informed officer, who studies his field, this is not news; it may even be said to be trite. But this is a vital subject and the lesson is one that needs constantly to be kept in mind. Indeed, one may go farther, and say that these needs must be met, if anything like perfect service is to be expected. As everybody knows, it is an unwise use of time and strength to attend to details (which are easy) while neglecting these fundamentals (which are difficult). It will be time well spent to re-read those two previous articles; not because the author finds things much different from what the rest of us have found them, but because he is a specially well qualified observer and has here written down a review from the standpoint of one who has done a prodigious amount of observing; and who expects to be cross questioned. Evidently Mr. Forman has done a lot of observing on other roads besides his own. It will be profitable also to read these articles while keeping in mind the counsel of numerous recent writers and speakers—railroad officers and others—to the effect that railroad men ought to practice the Golden Rule. Keeping that point in mind, almost any trainman (or trainmaster) who reads these articles should find them a real stimulant to improvement. Mr. Forman's argument might be translated as a plea to everybody to "have a heart." The officer who has a heart is always a subject of praise; let it be borne in mind that the qualities thus admired are equally commendable in all ranks. If your boss is "human" in his dealings with you, he will be glad to see a similar attitude on your part.

A Story with a Point

A railway executive in talking with a group of his employees recently told this little story which contains a world of truth: "Troubles almost always come from neither side seeing the picture in exactly the same way. One of the earliest stories that I ever heard was that of two knights in the olden days who met in a little wayside inn. One had come from the north and the other from the south. They sat there over their bottle of —well, it was not prohibition in those days and I take it they both got to feeling pretty good. After a while they got a little contentious, and one of the knights said to the other: 'That shield outside the inn is gold,' and the other fellow said, 'No, it is not, it is silver.' They quarreled over this question all the evening and a good part of the night. The next day they got out their horses and lances and after each had been thoroughly battered up they concluded it might be well to go out and look at the sign. They did so, and found one side of the shield had been painted with gold and the other with silver." This story emphasizes two things: First, both sides to a controversy should take pains to get at the real facts, and, second, they should have faith in each other in the knowledge that the present-day spirit is headed in the direction of intelligent co-operation and real brotherhood.

Where Do the Tie Producers Stand?

The National Association of Railroad Tie Producers is polling its membership to ascertain what action it should take with reference to the chaotic conditions now prevailing in that industry, as revealed in the *Railway Age* of July 14. The outcome of the poll will be watched with much interest by railway men, for it is known that there is a marked difference of opinion among the members of the association regarding this matter. The association was formed during the period of federal control when the purchase of ties was concentrated in a central agency of the Railroad Administration. It has been claimed that it includes in its membership concerns controlling more than half of the tie production of the country. If it should, therefore, desire to speak for the industry it can do much good. It is now on trial not only before its members but also before the railways, who are its customers. If it upholds the fair enforcement of the specifications *which it has adopted,* and thereby indicates its sincerity of purpose in adopting them, it can do much to remedy the chaotic con-

ditions which are now working alike to the detriment of the reputable producers and the railways. If, on the other hand, it countenances the present widespread deviations from the specifications, it will lose such standing and influence as it may now have among the railways. It is to be hoped that a constructive policy will prevail in order that the association may not lose the opportunities for service which rightfully belong to it. There is a need for an organization such as this to speak for the producers on subjects which are of concern to them and to their customers. Its voice will, however, have little influence if not used in behalf of sound policies.

More About the Fuel Association Contest

The erroneous idea has somehow gained ground among railroad trainmen and other operating men below the rank of superintendent that the International Railway Fuel Association's contest for the best paper on fuel economy is not bona fide—that the railroads are offering the prize, and that its award will be made by railroad officers to some favorite, more or less decided upon in advance. This charge is so obviously baseless to anyone in possession of the facts that it could well be ignored except that in several definite cases trainmen have given it as an excuse for not submitting papers. To counteract this mistaken idea the real facts of the case should be broadcast by all those interested. The initial prize of $100 to the writer of the best paper was not offered by any railroad, but was the personal contribution of Eugene McAuliffe, special representative, Union Pacific System, and is to be awarded through the association. The three judges, as announced on page 1710 of the June 30 issue of the *Railway Age*, also are not directly associated with any railroad so that, as far as may be possible, the award will be absolutely impartial. It is true that supplementary prizes are being offered by several railroads for the best papers submitted by employees of those roads, but in quite a few of these cases arrangements have been made for the papers to be passed on by the same three judges. The fairness of the contest cannot be seriously questioned. All papers should be mailed to J. B. Hutchison, secretary of the association, at 6000 Michigan avenue, Chicago, by August 31.

Car Movement Is a Terminal Problem

The railways have demonstrated in recent weeks that the problem of car supply can best be solved by the most efficient use of the equipment which is available. With the number of cars practically the same as in 1920, the roads are handling a business heavier than that of three years ago with a surplus of cars, whereas in the fall of 1920 there was a large shortage. The use of cars is a product of their loading and their movement. The former is dependent on the co-operation of the shipper while the latter is largely in the control of the roads. The problem of securing the maximum mileage from cars is that of keeping the cars moving. In the main this is a terminal problem for once a car is in a train it ordinarily proceeds to the next terminal with reasonable promptness. A terminal is built as a means of classifying cars for forwarding, yet it frequently gives the impression that it is used more for storage purposes. The attention which has been directed at yard operation during the last two or three years has given rise to the main tracker idea which is being adopted with profit by many roads and is worthy of consideration by others. Still other opportunities exist for the improvement of methods. The terminal is the crux of the transportation problem and the attention of operating officers should be focused on it constantly. It is here that congestion can be avoided. It is here that car mileage can be increased more than at any other point on the system and it is through these and other measures that the greatest economies can be effected.

The Tarafa Bill in Cuba

The Tarafa bill, now before the Senate of Cuba for consideration, provides for voluntary consolidation of the railways of the island and gives the proposed consolidated railway a distinct advantage over the several independent lines now operating. This bill was passed by the Cuban House of Representatives and by the Senate but was vetoed by the President. The House passed the bill over the President's veto and the measure has come again to the Senate for action. The United States Department of State has protested against the bill as inimical to American financial interests with investments in Cuba and, according to press reports, passage by the Senate is doubtful. Briefly, the bill authorizes the formation of a holding company to acquire all the railways and prohibits any other consolidations or the building of extensions by companies which do not join the combination. Furthermore, it forbids the construction of any more private ports (i.e., ports owned and used exclusively by one company) and provides for an export tax on goods shipped from such ports now in existence. The bill is intended to favor the ports open to all shippers and the common carrier railways as against ports and railways operated merely as plant facilities. By way of compensation for its restrictions upon shippers, the bill provides for lower rates on sugar carried by the proposed consolidated railway. Naturally the financial interests owning industries which operate private railways and ports are opposed, probably with some justice, to the bill as it stands. There are many things to be said in favor of some features of the proposed law, however—among them greater standardization permitting freer interchange of equipment among the railways and, perhaps, the utilization as common carriers of some lines now operated as plant facilities. A compromise is to be desired which would safeguard the interests of the shippers operating their own facilities, while at the same time securing the advantages of greater unification. Probably if the interested parties would get together with a desire to arrive at a solution such a compromise might be effected.

Progress on Railroad Transportation Program

A VERY SUBSTANTIAL degree of progress made by the railroads under the program adopted at the meetings of the American Railway Association and of the Association of Railway Executives in New York on April 5 for meeting the heavy demands for transportation in 1923, in spite of the handicaps created by the shop strike of last year and the inadequacy of railroad revenues in recent years, is indicated in the monthly report just issued by the Car Service Division of the American Railway Association.

During the 31 weeks of 1923, from January 1 to August 4, the roads have handled 28,990,341 carloads of revenue freight, as compared with 26,011,279 in the corresponding weeks of the previous record year 1920, and for the week of August 7 there was still a net surplus of 64,000 cars. From January 1 to August 1 the railroads had put into service 96,950 new freight cars and 2,221 locomotives, while 86,716 cars and 1,772 locomotives were still on order for future delivery. The number of freight cars awaiting repairs, which the roads resolved to reduce to 5 per cent by October 1,

had been reduced from 9.5 per cent on January 1 to 8.3 per cent on August 1, and the number of locomotives awaiting heavy repairs, which they hope to reduce to 15 per cent by October 1, had been reduced from 21.1 per cent on January 1 to 16.2 per cent on August 1. A still greater reduction had been made in the number awaiting light repairs, from 3 per cent to 1.9 per cent, so that the total number in need of repairs had been reduced from 24.1 to 18.1 per cent. The average load per car, which the shippers were asked to try to increase to 30 tons, shows a reduction from 29 tons in January to 28.2 in June, but there has been an increase since April, when the average was only 27.6 tons. The average mileage per car per day, 28.3 for June, the last month for which the statistics are available, shows an increase of 2.5 miles since January.

The railroads also resolved to complete their storage of coal for railroad fuel use by September 1, so that after that date the equipment and other transportation facilities may be used to the greatest extent for commercial coal necessities. Progress in this direction is shown by the fact that on August 1 the railroad fuel stocks amounted to 14,098,776 tons, as compared with about 7,500,000 on April 1 and 11,707,910 on August 1 last year. Of the 14,000,000 tons, over 11½ million tons were held in stock piles and less than 2½ million tons in cars.

Employee Representation

THE REPORT of the special committee of the National Economic League on "Readjustment in Industrial Relations," which is devoted almost entirely to the question of the extent to which employees should have representation in management, and which is reproduced in full elsewhere in this issue, is of special interest just at this time to both railway managements and workers. There seems to be no question in the mind of any one but that a greater degree of co-operation is advisable in railroad organizations and, indeed, is necessary between all of the factors involved, including the public, the workers, the managements and the investors. Unfortunately, there is a lot of loose thinking being done, some of it based upon misinformation or incomplete information, or else due to the fact that real, clear, thorough thinking is hard work, from which we shrink.

The public is vitally concerned in this whole question, because so much depends upon rapid and efficient transportation, rendered at as low a cost as possible. A great amount of educational work has been done in recent years to awaken the public to the necessity for fostering its transportation systems, rather than throttling them to a point where they cannot function to the best interests of the public. One factor, however, which has greatly irritated the public has been the apparent lack of co-operation between the employees and the managements, as demonstrated by the constant bickerings between the representatives of organized labor and the managements which have been carried over into legislative bodies and before various commissions and boards. A canvass of the situation, however, would seem to indicate that both the men and the managements are awakening to the necessity for getting together and developing a larger degree of teamwork—for their own sakes and in the interests of the public. As a matter of fact, very great strides have been made in this direction in recent months as is today clearly evidenced by the fact that a record-breaking business is being handled so effectively.

As industrial and transportation companies have grown larger and larger and have perfected their organizations, the vital importance of the human factor has been overlooked. Men will not be satisfied merely with good wages and favorable working conditions. They object to being handled mechanically and in large groups; they will not be contented unless they are treated as individuals rather than as numbers. Something must therefore be done to insure that they will have a representation in those things that concern their welfare.

A number of experiments have been made with various forms of employee representation and the above mentioned report in a large way reviews the situation to date. In studying this whole situation, two things must be kept ever in mind: First, that no scheme of employee representation can be a success unless it is based upon the right sort of spirit on the part of all involved—a spirit of real brotherhood and of faith in mankind. Second, this spirit cannot prevail if the plan is autocratically imposed from above. It must be worked out jointly, all those involved participating in the spirit of co-workers. Any plan which loses sight of these two factors will fail.

The Knowledge of Costs

IT IS the duty of a railway to handle all of the traffic offered to it. It is its privilege to compete for business by active solicitation, by offering superior service and by any other legitimate means at its command. It is in the careful selection of the traffic which it will solicit in competition with other lines, or which it will develop by offering additional service, that the success of a railway largely depends. This selection cannot be made intelligently without a thorough knowledge of the cost of handling the specific traffic under consideration and of the rates it will carry.

Because of the difficulty of segregating the cost of handling a specific commodity, few roads have sufficient information to enable them to pass on such questions with any high degree of accuracy, and decisions are made largely on judgment which, while probably correct in a large majority of cases, may be widely in error in some. Neither can averages be applied to the handling of a specific commodity for that commodity may require special service or equipment, may be subject to large claims or may, of necessity, be handled over divisions of heavy grades. Thus, a recent investigation of the cost of handling a perishable commodity yielding a high revenue and moving in carload lots over a western road developed the fact that because of the light train tonnage required to protect the movement of this traffic, it was being handled at a considerable loss and it was allowed to move over a competing line. To provide information which will detect losses of this character, the operating department of one large road includes on its staff specialists whose duty is to analyze and determine the cost of handling specific traffic in order to assist the traffic department in deciding whether it will pay the road to endeavor to hold or to develop this business. In other instances, it is called upon to ascertain whether certain traffic now being handled is yielding its proper portion of the net earnings.

Many businesses have incurred large losses for years because of failure to detect drains caused by the carrying of certain lines of products which were not contributing their proper proportion to the net profits of the company. Other organizations have been more successful because they have detected and eliminated those drains. The same principle applies to the railway business with even greater force because of the wide diversity of services rendered. By detecting and eliminating as far as may be practicable, or at least by not competing for such traffic, by offering only such service as its rates reasonably entitle it to and by concentrating its solicitation on those classes of traffic which yield the greatest net profit, the roads will apply those principles which have been found successful in other lines of business and will increase their net earnings accordingly.

A Big Construction Program

IN SPITE OF THE FACT that the railways are now in the midst of the most active construction program which they have undertaken during the last ten years, more work has been authorized during the last few weeks than in any similar period for a long time. Among these projects, that of the Illinois Central for the construction of a new line from Edgewood, Ill., south 175 miles to Fulton, Ky., involving an expenditure of more than $17,000,000 is the most important. Immediately following the approval by the Interstate Commerce Commission of its application for authority to build this line, officers of the road announced that work on this improvement would start at once. About the same time Julius Kruttschnitt, chairman of the board of the Southern Pacific, stated that in view of the announced decision of the government not to appeal the decision leaving control of the Central Pacific in the hands of the Southern Pacific, that road would proceed at once to build the Natron cut-off of 118 miles in eastern Oregon which will cost more than $16,000,000. With the Union Pacific's extension from Rogerson, Idaho, south 98 miles to Wells, Nev., which was authorized by the Interstate Commerce Commission recently, work on nearly 400 miles of new lines will be started promptly.

The authorization of these new lines is indicative of the large amount of improvement work of other character which is also being undertaken. The Chicago, Milwaukee & St. Paul has awarded contracts within the last month for the construction of 36 miles of second track in Illinois and Indiana, and the Louisville & Nashville has contracted for the building of 55 miles of second track which is estimated to cost $3,500,000. The Kansas City Southern has authorized the reduction of grades costing more than $3,000,000; the Chicago Union Station Company has awarded a contract for the building of a headhouse at a cost of more than $10,000,000; bids are now being received for the driving of the Moffatt tunnel under the continental divide in Colorado which is approximately six miles long and is estimated to cost more than $6,000,000; the Atchison, Topeka & Santa Fe has started the construction of a ten-story general office building at Topeka, Kan., while the Union Pacific has authorized the expenditure of $3,000,000 this year for preliminary work in the development of an industrial district at Kansas City, Kan.

With the demand for increased facilities evidenced by the continuation of a record-breaking traffic and with the improvement in earnings resulting from this traffic, the roads are showing evidences of a willingness to expand their facilities which characterized their activities prior to 15 years ago. Since the season is so far advanced that most of the projects now being authorized must, of necessity, be continued over into 1924, indications point to the continuance of construction activities through next year.

New Books

Locomotive Catechism. By Robert Grimshaw, 958 pages, 5½ in. by 7¾ in., 468 illustrations, bound in cloth. Published by the Norman W. Henly Publishing Company, New York.

This is the thirtieth edition of a book which for a number of years has been considered as the standard authority in its class. It is written in a simple and easily understandable manner such as will appeal to firemen, engineers, trainmen, switchmen, shop hands and enginehouse men for whom it has been prepared. The text follows the form of examination questions and answers, of which there are some four thousand. Considerable new matter has been added in this edition and the old matter carefully revised. The chapters, of which there are eighty-nine, are short and conveniently headed for ready reference and cover the various details, such as boilers, cylinders, valve gear, running gear, superheaters, air brakes, etc. The book tells not only what to do, but also what not to do and is specially helpful for a person preparing for an examination for promotion.

Industrial Democracy; a Plan for Its Achievement, by Glenn E. Plumb and Wm. G. Roylance. 359 pages. 5½ in. by 8 in. Bound in cloth. Published by B. W. Huebsch, New York.

This book is no mere pamphlet of propaganda for the Plumb plan. Propaganda it contains in great plenty, but primarily it is a somewhat scholarly and apparently sincere examination of industrial evils, real and imagined, with a description of Mr. Plumb's own patent remedy for them.

Railroad officers of a studious bent will find this book both interesting and valuable. In some respects the book cannot be commended. For instance, in building up his basic theory, which is that democracy is and always has been a sure cure for industrial and political ills, Mr. Plumb has made several deductions from inadequate and inaccurate data and has made over in part the science of economics to suit the purposes of his argument. Consequently, to one not rather well grounded in economics and history the book is likely to give misinformation. On the other hand, it would not be right because of the inaccuracies which do exist to condemn the work entirely.

The book begins with a chapter called "the Collapse of Autocracy" in which the present state of world disruption is cited to show what autocracy leads to. This is followed by Chapter II, "the History of Democracy." The opening sentence of this chapter is: "The history of democracy is identical with the record of human progress." The author says that the nations that have made the most progress are the most democratic and that always the most democratic nations have built up the highest and the most humanly valuable institutions. He goes from this to the praise of the early democracy of the Greeks. We wonder just how a civilization based on slavery could excite the admiration of a protagonist for "industrial democracy."

Present day democracy he traces back in an unbroken line to the Greeks, saying that it lived continuously and prosperously through the dark ages and the middle ages and that the institution of feudalism never could overcome it. This democracy was, he says, kept alive by the medieval craftsmen's guilds and was applied in their relations with each other and in local government. The political and military autocracies of the kings and emperors began to take on the attributes of democracy in early modern times only when forced on them. Principles developed by the guilds for industry were applied gradually to government with the result that now most governments of the world are to some degree democratic either in form or practice.

He then goes on to a discussion of the development of democracy in America and tells how this democracy is threatened by the growth of corporations, monopoly and the concentration of financial power. To quote a few passages:

"The enormous profits accumulated by the great lumbering, mining, manufacturing and transportation companies, secured and increased by investment in land, gave them control of the credit of the nation, thus enabling them to draw to themselves yet more of the earnings of farmers, wage earners and other independent producers, while all consumers were placed more and more at their mercy. Finally, the industrial corporations themselves were brought largely under control of a group of banking syndicates, so that a financial policy, directed to the accumulation of wealth, came to dominate American industry, rather than a policy directed to the supplying of the economic wants of the people."

"A sound policy in the interest of the corporations themselves would have provided that wages should increase with general industrial efficiency, both in order to insure the maintenance of labor efficiency, and in order that the people would be able to buy the increased quantities of goods produced, so that profits could be

made from their manufacture and sale. But it actually happened that, measured in terms of buying power .... the earnings of the workers were decreased as the efficiency of industry increased."

"It must be admitted that American industrial corporations, as a rule, have higher efficiency than co-operative or publicly owned and operated industries. That is not because they are autocracies, but because they are corporations. The superior efficiency of the corporation is due in part to the fact that it operates under a grant from the public, bestowing upon it important privileges and immunities; and in part to the fact that it is a superior method of mobilizing capital, organizing ability and labor. The corporation is a form of industrial co-operation, and not necessarily a form of industrial autocracy. The corporation was originally created to serve the public interest; but industrial autocracy has perverted it to the uses of industrial oppression."

So much for the iniquities of the corporations which industrial democracy would put an end to. The corporation is, according to Mr. Plumb, the most efficient form of industrial organization, but unfortunately it has too much power which it does not use as it should. Financial power runs the potentially beneficial organization for its own purposes. Let us, he says, give labor and the consuming public each a share in its control and we will have put an end to all the damage that a corporation might do while not restricting its ability to do good.

To reorganize industry according to his plan, Mr. Plumb proposes four methods to be applied to four different classifications of industry, viz:

A. National public utilities, including railroads and communication. For this group the Plumb plan provides for purchase by the government and lease to a corporation, governed by a board of directors representing equally labor, management and the public. If, due to increased efficiency, a surplus should be earned, this would be divided into two equal parts, one for labor and management and the other for the public, to be spent for additions and betterments. If for any year this public surplus should be larger than a certain fixed per cent, rates would be reduced to absorb the excess.

B. State and municipal public utilities. These would be owned by the local governments and operated by corporations similar to that provided for Class A.

C. All other industries based on grants, privileges or exploitation of natural resources or in which there exists any natural or economic monopoly. For this group corporations would be formed issuing stocks and bonds in the usual way. In addition "labor stock" of no par value and carrying with it only the voting privilege would be issued to each employee in proportion as his wages compared with stockholders' dividends. For example, an employee earning a wage of $1,800 a year would have the same voting rights as the holder of $30,000 of stock paying dividends at the rate of 6 per cent. These corporations would be required to use half of their earnings in excess of operating expenses and dividend requirements in retiring capital or in additions and betterments.

D. All other industries. Any industries not coming under the three classifications above could conduct their affairs as desired, unless organized as a corporation, when the plan proposed for Class C would have to be followed.

This, in brief, is the Plumb plan for industrial democracy. The potential evils of the plan as applied to public utilities, completely disfranchising the financial interest in the properties except as represented by the minority public group on the boards of directors, seem sufficiently patent to require little comment. The plan as applied to all corporations except public utilities would simply mean complete employee control of most industries, under the scheme of voting provided. Suppose, for instance, a concern had 1,000 employees earning an average wage of $1,800. This would make an annual payroll of $1,800,000 and the concern would have to have $60,000,000 of 6 per cent stock outstanding exclusive of bonds to give its stockholders an equal voice with labor in the conduct of the business.

Mr. Plumb's posthumous book describing his plan and arguing for its adoption is not worthy of much attention because of any merit intrinsic in the plan. Railroad men, however, might do well to familiarize themselves with Mr. Plumb's arguments for the one reason, if none other, that they form the basis of the industrial creed adopted by the leaders of the railway unions. Furthermore, no one can deny that there are certain evils and certain injustices in industry today which should, if possible, be removed. The Plumb plan is suggested as a remedy for some of these conditions and, in a way, is a challenge to those in control of industry to remove these conditions or else to give the advocates of the Plumb plan a chance to do so. A full knowledge of Mr. Plumb's philosophy might serve to indicate to those on the employers' side of the fence the nature of the problem they must face in developing sound and cordial relationships with their employees. An understanding and appreciation of the plans of the opposition is always an asset in dealing with it.

New Books and Special Articles of Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

A Book About the L. & N. An historical and descriptive pamphlet issued by the Louisville & Nashville Railroad, containing concise narration of general railroad history as well as the history of the road and the section it serves. 55 p. Published by the Chambers Agency, New Orleans and New York.

Classification of Railroad Bonds. Prepared and issued by Tobey & Kirk, New York and Akron. Folding Chart.

The Iron Horse and the Strange Language He Speaks, by George Clarence Hoskin. A story about railroads primarily for youngsters. 250 p. Published by Harper's, New York and London.

A List of References on the Proposed Consolidation of Railroads, compiled by the Library of the Bureau of Railway Economics. 29 mimeo. p. Issued by the Library of the Bureau.

The 10:30 Limited: a Railway Book for Boys of All Ages, by W. G. Chapman. All the signals and others things connected with railways seen on a journey via Great Western Railway from London to Plymouth entertainingly explained. Published by the Great Western Railway Company, Paddington Station, London.

Why Western Railways Cannot Reduce Rates, by Samuel M. Felton. Reprint of an article in Chicago Evening Post, July 20, 1923. 6 p. Published by Western Railways Committee on Public Relations, Chicago.

Periodical Articles

Among the Railroads, by Franklin Snow. Review and comment upon current railroad developments. Christian Science Monitor, August 3, 11, 17, 1923, p. 10, 10, 9.

Backwardness of China Attributed Largely to the Lack of Railroads, by J. B. Powell. Present situation, its background, and what could be done about it. Washington Post, August 20, 1923, p. 5, col. 1-6.

Modern Trackwork and Its Importance, by Sir Robert Hadfield. Investigations, in England and America primarily, into track steel problems and results. Sir Robert invented manganese steel. Journal of the Institute of Transport, July, 1923, p. 320-343.

The Pacific Railway of Colombia, by Charles O. Frey History and present conditions. Commerce Reports, August 20, 1923, p. 493-494.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

Side Bay Cabooses

NEW YORK.

TO THE EDITOR:

I was much interested in the article on the side bay cabooses of the Akron, Canton & Youngstown (in *Railway Age,* August 11, page 237), and in your editorial comment. I wonder whether you are aware that the Canadian Pacific tried out a similar type of bay window some years ago and after many months of trial abandoned it. In fact, I think that the company was ordered to do so by the board of railway commissioners after there had been several accidents in which men sitting in the bays had been injured in sideswipes or by objects protruding from passing trains. But aside from this feature the window is not a success as an observation point. It is so close to the track that it is right in line with the swirling dust or snow cloud and is too close to the side of the train to make it possible properly to observe the train except on curves in one direction. Moreover the observer is required to sit in a very unnatural position in order to look out along the side of the train, either sitting facing into the caboose with the head turned looking over the shoulder, or sitting side-wise in the seat with the head cocked over to one side. Either position becomes very tiring after a few miles.

The Canadian Pacific did not remove the cupolas from the cabooses so equipped and the trainmen continued to use them. In winter the side bay is almost useless as it is frequently clouded by frost or snow, as are the cupola windows a good deal of the time, but in the cupolas the trainman can put his head out occasionally and get a fairly good look at his train.

V. T. BOUGHTON.

Railroads Doing a Good Job

NEWTON CENTER, MASS.

TO THE EDITOR:

A friend who travels much and is very industrious with his camera sends me numbers of photographs of railway interest during the course of a year. Many of these show localities with which I have been familiar in the past, and which now give evidence of great improvement.

What impresses me most is the large number of spacious and well designed stations to be found in the west. For example, when I was in Salt Lake City in 1902 the station accommodations were of a modest character, to say the least. Today, there are two splendid structures which constitute architectural adornments of no mean order. In Kansas City, Mo., there is a station sufficiently impressive to suit any but the most captious critic, besides affording conveniences of a very practical character. In Denver a clever baggage handling system adds greatly to the ease and speed with which the station's business is cared for. Other instances of the "go-ahead" spirit might be mentioned, but these will answer my purpose.

The old-time terminal station, with its large trainshed, was doubtless more picturesque and romantic to the confirmed railway enthusiast; but experience has shown that such structures were not easily cleared of the gases and assorted odors which are apt to become "pocketed" in even the best of them.

Moreover, repairs to the members of the supports and spans are rather frequent and costly, and general cleanliness a matter of some difficulty. The South Station at Boston is an example of this, although it is only 24 years old.

One of the most famous of the old stations was, of course, the Grand Central at New York, built in 1871. There was less trouble there, however, because the main trainshed was used for out-bound traffic and the trains were so long that the engines were "out-of-doors," so to speak. Nevertheless, there was a slight odor of gas at all times, due to the use of this agent for illuminating purposes.

In view of the experience in this country, it is of some interest to note that the old style trainshed still persists abroad. The historic twin sheds of King's Cross still stand in London, as well as the single arch of St. Pancras, the series of sheds constituting Liverpool street, and the rather artistic group of structures covering the tracks and platforms at Paddington. It is a matter for some surprise that the railways involved have been able to keep up with the increases in their business in the rather cramped quarters which location in a densely populated city originally imposed upon them.

It seems to me that our good people have little to complain of, after all! Of course, both stations and train service are rather poor on out-of-the-way lines and less prosperous routes of travel; but these roads do not handle the nation's business, in any case, and "cut a very small figure" in the grand total of the world's work.

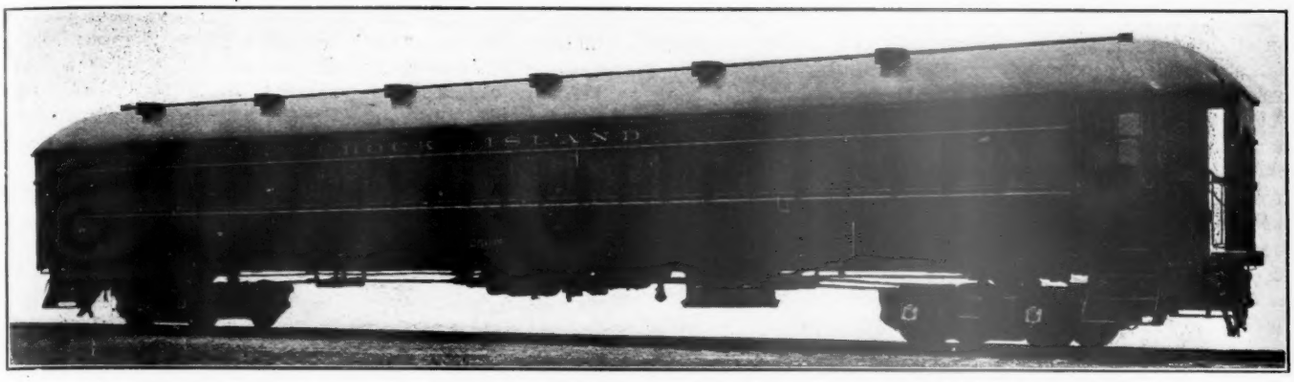
It is easy enough to find fault—any fool can do that! But it is quite a different matter to offer useful advice while giving praise where it is due. From what I have been able to discover, it would appear that a little "stiffening" in maintenance standards would help some roads considerably. The labor problem is back of this, of course. Too many boys want to be president of the road before they have learned to wipe an engine. That's why grates don't work and cab windows are loose on engines that have been through the shop. Not being a natural-born "knocker" I don't want to say too much along these lines, however.

What I would like to bring out, though, is the fact that, while theorists have been hunting mares' nests, the railroads have been spending good money so that you and I and the rest of us can get where we want to go, and find a decent place on arrival!

And, while we are about it, we might ask how many new stations or other improvements we would have gotten if official positions on railroads had been subject to political considerations, and minor jobs had been "handed out" by ward heelers. That's what government ownership would have meant—and that's what it will mean if ever put into effect.

ARTHUR CURRAN.

THE SPECIAL RAILROAD COMMITTEE of the Boston Chamber of Commerce, Homer Loring, chairman, has made a report to the Chamber embodying the conclusions of its studies, covering more than a year, of the general New England situation; and the conclusions are substantially the same as those of the committee appointed by the governors of the six New England states, whose report was recently published. The Interstate Commerce Commission is urged to adopt a plan for the consolidation into one system of all the railroads of New England, except the Boston & Albany and the roads controlled by the Grand Trunk of Canada (the Canadian Government). The report of the Loring committee has been approved unanimously by the directors of the Chamber, and copies will be sent to the 7,500 members of the Chamber with a questionnaire.

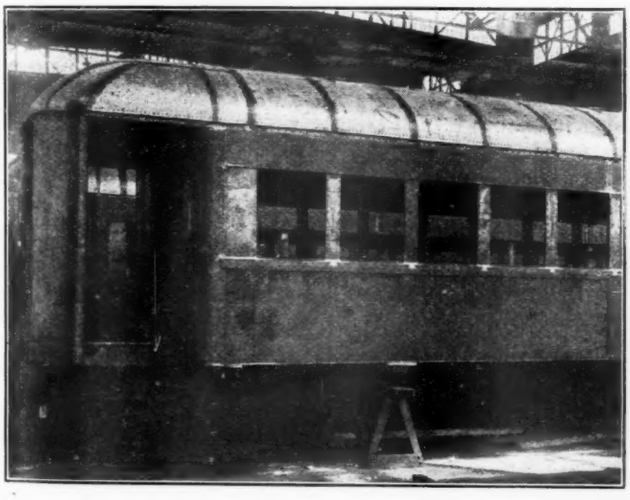


Seventy-Foot Steel Suburban Car Built for the Chicago, Rock Island & Pacific by the Standard Steel Car Company

Suburban Car Featured by Low Unit Weight

New Rock Island Steel Coach Weighs Only 920 Lb. per Seated Passenger—Special Lighting Equipment

AS A PART of a program calling for the expenditure of $1,000,000 this year in new equipment, the Chicago, Rock Island & Pacific early in the year placed an order for 50 steel suburban cars with the Standard Steel Car Company. These cars, designed by the Standard Steel Car Company in accordance with specifications prepared by the Chicago, Rock Island & Pacific, are now being delivered and mark an important step forward in the design of this type of car. Without sacrificing strength, the weight of the car has been kept down to 92,100 lb., the body weighing 66,400 lb. and the trucks 25,700 lb. The seating capacity is 100, thus making the weight per seated-passenger approximately 920 lb. These cars are believed to weigh less per seated passenger than any heretofore built.



Erecting Work Completed—Car Ready for Application to Trucks

Particular attention has been given to the comfort and convenience of the passengers as will be seen in many features of the design. The rattan cross-seats, of the Walk-over type, have been made wider than usual in suburban cars and are designed to give maximum comfort to two passengers in each seat. The seat backs are equipped with neat brass handles next to the aisle and 10 hand straps are provided in each end of the car for the convenience of passengers who may be standing in front of the longitudinal seats. The window arrangement has been worked out so as to provide an unobstructed view, and there is a full window to each seat. The window sills are at a convenient height and form comfortable arm rests for passengers sitting next to the windows.

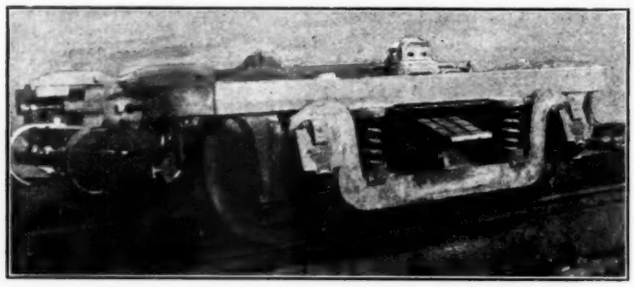
Interior View of the Car Completely Equipped Ready for Service

In order that passengers may be protected from cinders as much as possible, these windows have been arranged so that they can be raised but 10 to 12 in. At the same time, the

bottom rail of the sash does not interfere with the view of an adult passenger. The end doors, as well as the platforms and steps, have been considerably widened over those of other cars of this character so that two lines of passengers can pass out of the doors and down the steps at the same time. End hand rails extend from the door posts to the side of car, parallel to the platforms and slope of the steps. These features, together with the longitudinal seats at each end of the car and the absence of arm rests on the aisle ends of seats, will permit an unusually rapid loading and unloading of passengers. Platforms are provided with safety gates that automatically lock in either open or closed position.

The electric lighting system is designed to afford the best distribution of light that it is possible to obtain, by means of a row of 13 lamps, mounted on each side of the car, each row being located approximately over the center of the cross seats. One lamp is also mounted above each platform step.

The heating system is of the vapor type with double automatic thermostatic control. This control is entirely automatic and does not need the attention of train crews or yard men to operate it. It automatically keeps the temperature



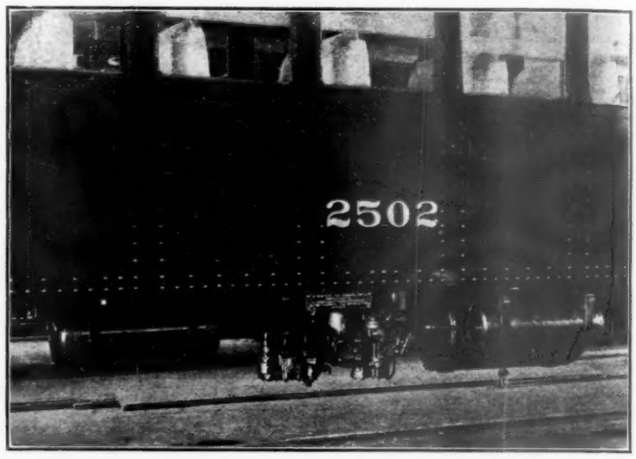
Four-Wheel Truck Equipped with Cast Steel Frame and Clasp Brakes

of the car between 70 and 73 deg. F. while in train service and at 50 deg. F. while standing on steam in the yards.

While it is true that the ratio of live to dead load has been given little consideration in passenger service, these cars represent decided progress towards establishing a desirable relation from the operating viewpoint. The light weight plus the use of clasp brakes and arrangements for rapid loading and unloading will permit of decreases in the time increments required for acceleration, deceleration and station stops.

The length of the car over the body end posts is 70 ft. 4 in. and the width over the roof sheets, 10 ft. 0⅛ in. The total height above the rail is 13 ft. 7¾ in. There are 42 cross seats each seating two persons and four longitudinal seats, each seating four persons. The ease of entrance and exit are readily apparent from the drawing which shows the end doors to be 3 ft. 3 in. wide and the steps 3 ft. 4 in. wide. The two end doors are of the sliding type with latches similar to those used on subway cars. The doors can be readily moved by a pull on the handle, but as soon as the handle is released, the door is automatically held in position to prevent slamming. No doors are provided in the vestibules of these cars, gates being used instead.

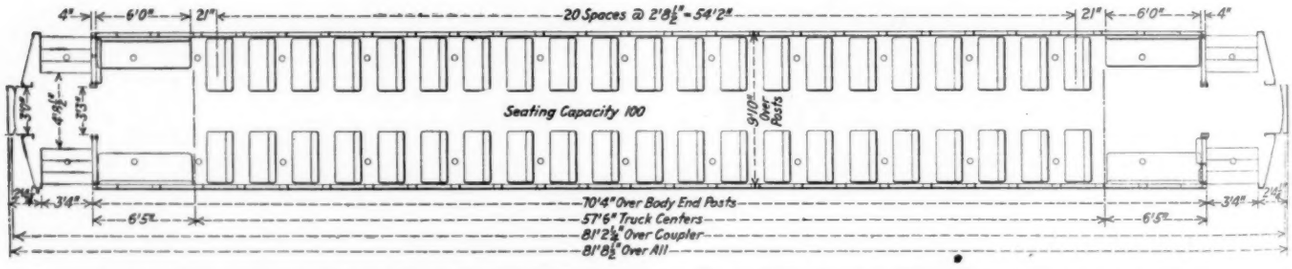
The light weight of these cars was made possible solely by careful analysis and calculation, no use being made of light weight non-ferrous metals. With the exception of the zinc bottom floor sheet and galvanized roof sheets the cars are constructed throughout of copper bearing steel insofar as all



Application of Westinghouse Type U. C. Brake Equipment

sheets, plates and structural members are concerned. The side girder type of construction is used with the sides from belt rails to side sills designed to carry the vertical loads. Vertical loads imposed upon the floating center sills are transmitted to the side girders by three substantial cross-bearers. Cast steel combined body bolsters and platform castings are used. The roofs are of the elliptic type, the design making use of a relatively long middle ordinate so as to provide a pleasing roof contour from both inside and outside. The car bodies are equipped with friction draft gears and friction buffers.

The equipment includes four-wheel equalized trucks having cast steel truck frames with integral pedestals, 33-in. solid wrought steel wheels, axles with 5-in. by 9-in. journals, roller side bearings and clasp brakes. The wheelbase of the trucks is 6 ft. 4 in. and the distance between truck centers is 57 ft. 6 in.



General Arrangement of New Rock Island Steel Suburban Cars Built by the Standard Steel Car Company

The electric lighting equipment is of interest because of the provision made to prevent a complete light failure at any time, and also because of the provision made to enable the use of either 64 or 32-volt current supply. The Rock Island standard car lighting service utilizes a 7½-kilowatt 64-volt turbo-generator with the necessary control devices placed on the suburban locomotives, using three-wire train lines for distribution to the cars. However, it is occasionally desirable to attach a suburban car to the rear of a regular main line train, at which time the lighting equipment of the car must be

so designed that the car will automatically make the proper connections for utilizing 32 volts on the lighting circuit instead of 64 volts. To this end, each of the new steel suburban cars is equipped with an especially designed automatic selector switch. This switch automatically causes the proper voltage to be impressed upon the lamps, regardless of whether

Interior View, After Assembly of Underframes, Sides and Roof

the current supply to the car through its train line connector is 64 or 32 volts. This switch operates in conjunction with a manually controlled switch which is the only part of the entire equipment that is accessible to the trainmen. This is a four-position switch with the lever operating in one direction from the first step, which is the off position. The second step is the full-on position, the third step is the first emergency position and the fourth step is the second emergency position. This switch is plainly stenciled to insure proper operation by the trainmen.

Each car is equipped with a 32-volt, 80-ampere-hour emergency storage battery floated on the train lines through a resistor. This battery is so connected that in case of failure of the current supply from the engine, its current is automatically made available for the lamp circuits, it only being necessary for the trainmen to throw the four-position trainmen's switch into one of the two emergency positions. The connection of the wiring to the trainmen's four-position switch is such that should he fail to secure light when he places the switch handle in the first emergency light position, he has only to push it on a little further to the second emergency light position when light will be secured. The lamps are so connected in series parallel in alternate pairs that when the four-position switch is in either of the two emergency positions that only one-half of all the lamps in the car are lighted. An even distribution of the lighting, however, is maintained due to the method of wiring and location. This emergency lighting arrangement affords ample lighting for the car by having all the lamps in the car connected to one or the other of the two emergency circuits. It is always possible in case of failure of one circuit to still supply ample light to the car with the other circuit and at the same time maintain an even distribution of the light.

Inasmuch as the battery with which these cars are equipped is used primarily to control the heating system, and only serves in an emergency for lighting, a small size, lightweight battery is used. The heating equipment includes an air operated switch that disconnects the lighting circuit from the battery, when there is no air on the car, so that the battery cannot be bled when cars are standing in yards.

Freight Car Loading

WASHINGTON, D. C.

REVENUE FREIGHT CAR LOADING during the week ended August 11 showed a decrease of nearly 60,000 cars as compared with the preceding week. The reduction, however, is attributed entirely to the cessation of industry for various periods during the week of the funeral of the late President Harding. As the reduction represents only a part of one day's loading, it is believed that the figures would otherwise have shown an increase. The total, 973,162

REVENUE FREIGHT LOADED

Summary—All Districts. Comparison of Totals This Year, Last Year, Two Years Ago. Week Ended Saturday, August 11, 1923

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded	Corresponding period		Received from connections	Corresponding period	
										1923	1922	1921	1923	1922	1921
Eastern	1923	8,686	2,759	47,683	3,419	5,874	8,804	60,392	87,645	225,262	....	....	258,127	....	....
	1922	10,956	2,802	8,656	1,500	5,341	6,517	66,921	92,502	....	195,195	196,553	....	204,535	195,350
Allegheny	1923	3,579	2,622	51,918	6,453	3,596	17,037	45,693	76,598	207,496	....	....	145,118	....	....
	1922	3,820	2,745	20,506	4,179	3,182	12,645	49,897	77,587	....	174,561	159,339	....	114,397	104,198
Pocahontas	1923	359	160	28,843	580	1,863	210	6,200	4,530	42,745	....	....	16,335	....	....
	1922	236	204	21,156	237	1,032	33	3,702	2,592	....	29,192	29,142	....	10,393	12,979
Southern	1923	3,691	2,033	21,597	1,135	23,327	1,702	37,225	36,621	127,331	....	....	78,459	....	....
	1922	3,931	2,148	17,407	960	16,769	1,227	34,134	32,337	....	108,913	108,981	....	66,513	61,339
Northwestern	1923	10,883	7,816	10,158	907	19,122	50,933	29,825	38,080	167,724	....	....	52,390	....	....
	1922	13,812	6,621	5,995	968	14,790	46,336	29,081	29,655	....	147,258	125,494	....	40,895	47,349
Central Western	1923	13,859	12,029	13,076	291	11,290	2,725	34,243	52,917	140,430	....	....	65,475	....	....
	1922	18,640	10,898	6,060	393	8,380	2,222	34,184	54,559	....	135,336	126,897	....	62,568	51,104
Southwestern	1923	5,092	3,388	3,984	149	8,366	418	14,107	26,670	62,174	....	....	44,921	....	....
	1922	5,923	3,007	3,118	178	6,157	478	12,694	20,680	....	52,235	61,863	....	40,352	45,333
Total West. Dists.	1923	29,834	23,233	27,218	1,347	38,778	54,076	78,175	117,667	370,328	....	....	162,786	....	....
	1922	38,375	20,526	15,173	1,539	29,327	49,036	75,959	104,894	....	334,829	314,254	....	143,815	143,786
Total, all roads	1923	46,149	30,807	177,259	12,934	73,438	81,829	227,685	323,061	973,162	....	....	660,825	....	....
	1922	57,318	28,425	82,898	8,415	55,651	69,458	230,613	309,912	....	842,690	....	....	539,653	....
	1921	61,326	26,307	156,891	4,355	44,963	32,949	216,211	265,267	....	....	808,269	....	....	517,652
Increase Compared	1922	....	2,382	94,361	4,519	17,787	12,371	....	13,149	130,472	....	....	121,172	....	....
Decrease Compared	1922	11,169	....	....	....	....	....	2,928	....	....	....	....	....	....	....
Increase Compared	1921	....	4,500	20,368	8,579	28,475	41,880	11,474	57,794	164,893	....	....	143,173	....	....
Decrease Compared	1921	15,177	....	....	....	....	....	....	....	....	....	....	....	....	....
Aug. 11	1923	46,149	30,807	177,259	12,934	73,438	81,829	227,685	323,061	973,162	842,690	808,269	660,825	539,653	**517,652**
Aug. 4	1923	52,871	31,480	190,531	13,458	76,095	83,507	240,465	344,723	1,033,130	842,663	786,178	681,425	543,964	**508,356**
July 28	1923	53,160	31,849	194,546	14,274	77,799	83,633	240,046	345,737	1,041,044	848,858	795,432	663,447	537,056	**505,051**
July 21	1923	46,275	32,454	190,788	14,888	75,808	84,307	240,182	344,225	1,028,927	845,548	788,034	657,283	525,940	**492,964**
July 14	1923	40,415	32,726	193,831	14,515	71,768	89,298	240,707	336,407	1,019,667	856,676	774,884	631,721	514,422	**474,268**

Compiled by the Car Service Division, American Railway Association.

cars, represents an increase of 130,472 cars as compared with the corresponding week of 1922 and of 164,893 as compared with the corresponding week of 1921. Increases over last year are shown in all classes of commodities except grain and grain products, which showed a decrease of 11,169, and merchandise l.c.l., which showed a decrease of 2,928. The largest increase aside from that in coal was in forest products, an increase of 17,787 cars. The reductions as compared with the preceding week were general.

The freight car surplus continued to decrease and the car shortage to increase during the week ended August 7, following the trend of the preceding two weeks. As of that date the average surplus was 74,168 cars, a decrease of 2,285 as compared with the period ended July 31, while the reported shortage averaged 10,149, an increase of 579 in approximately a week. The surplus included 55,366 box cars and 6,093 coal cars, while the shortage included 3,162 box cars and 4,897 coal cars.

During the last half of July, 9,493 new freight cars were delivered to the railroads and placed in service, which brought the total number of new freight cars placed in service from January 1 to August 1 up to 96,950. The railroads also during the last half of July installed 121 new locomotives, making a total of 2,221 placed in service during the first seven months this year. Of the new freight cars placed in service during the last half of July, box cars numbered 3,595; coal cars, 3,133; refrigerator cars, including those delivered to railroad-owned private refrigerator companies, 1,846, and stock cars, 226. The railroads had on August 1, this year, 86,716 new freight cars on order with deliveries being made constantly. Of the total number on order, box cars numbered 38,689; coal cars, 34,457; refrigerator cars, 9,299, and stock cars, 2,214. They also had on order on August 1 a total of 1,772 new locomotives.

The railroads on August 1 had 189,014 freight cars, or 8.3 per cent of the total number on line in need of repair. This was an increase of 393 over the number on July 15, at which time there were 188,621, or 8.3 per cent. Compared with the number on July 1, it was a decrease of 1,397. Of the total on August 1, 144,566, or 6.3 per cent, were in need of heavy repair, an increase as compared with July 15 of 1,285. There were also 44,448 freight cars in need of light repair, which represents a decrease of 892 within the same period.

The railroads from July 15 to August 1 repaired and turned out of their shops the largest number of locomotives for any semi-monthly period in their history, a total of 22,200. This exceeded by 794 the previous record which was established during the last half of May, when 21,406 locomotives were repaired. Locomotives in need of repair on August 1 this year totaled 11,555, or 18.1 per cent of the number on line. This was a decrease of 300 compared with the number on July 15, at which time there were 11,855, or 18.6 per cent. Of the total on August 1, 10,370, or 16.2 per cent of the number on line, were in need of heavy repair, a decrease of 414 since July 15. There were also on August 1 this year, 1,185, or 1.9 per cent in need of light repair, an increase, however, or 114 over the number in need of such repair on July 15. The railroads on August 1 had 52,385 serviceable locomotives, an increase of 313 over the number on July 15, while they also had 2,550 locomotives in good repair and in storage, which was an increase of 113 within the same period.

A bulletin issued to the railroads by M. J. Gormley, chairman of the Car Service Division, says that fruits and vegetables moved during August, September and October, 1922, amounted to 123,685 cars and it is estimated that 160,455 cars of fruits and vegetables will be offered for shipment during the same period this year. This means an increase of 36,770 cars over last year.

It is therefore more important than ever heretofore, in view of the greatly increased production, Mr. Gormley says, that—

Refrigerator cars, both loaded and empty, be moved promptly.

That there be no delay in placing the loaded car or the movement of the empty car when unloaded.

That embargoes be issued without any delay against any consignee due to accumulation caused by delay in unloading or otherwise.

The use of refrigerator cars for (so called) peddling of contents should be prevented by proper policing methods.

"Local agents and officers should keep constantly before shippers and receivers of perishable products, local associations and shippers' committees any instances of delay in unloading of refrigerator cars. Energetic action to prevent delay of every description to refrigerator cars on the part of railroads and the shippers and receivers of perishable traffic we believe will result in moving this year's crop without any serious car shortage."

Uniformed Policemen Stationed at Grade Crossings

Owing to the fact that the main line of the Erie passes through the center of the city of Youngstown, Ohio, crossing numerous dense traffic streets at grade, the problem of avoiding accidents is a serious one. While plans have been made for the separation of grades at these crossings, the expense is so great that relatively little progress has been made.

Three accidents happening in close succession recently brought this situation before the public. An analysis of these accidents showed that they could have been avoided if those concerned had exercised more care at the crossings and had obeyed the signals given by the men protecting the crossings. At each of these crossings involved in these accidents not only were gates operated by a gate tender, but a man was stationed on the ground to assist in clearing the crossing to permit the gates to be lowered.

In view of this situation, R. S. Parsons, vice-president of the railway, appeared before the mayor and council of the city with the statement that the efforts of the railway to afford protection at these crossings were ineffective unless the crossing men could have greater authority. On his recommendation the city placed traffic policemen at these crossings with authority to hold up traffic when trains were approaching. These men are under the control of the captain of the traffic squad, report to the police station at the beginning and end of their period of duty, have all the powers of regular traffic policemen, including that of arresting individuals disobeying signals, and wear the regular uniform of the traffic police. If their whistle warning is disregarded, the offender is given a summons and treated the same as if he had violated the same whistle at any street intersection.

This plan has now been in effect for several months and has proved entirely satisfactory. The drivers recognize the authority of these officers and obey their signals without question; damage to gates has been eliminated and accidents prevented.

The New York Dock Railway, operating freight terminals on the Brooklyn water-front, New York harbor, at Montague street, Baltic street and Commerce street, announces that henceforth freight will be transferred every week day to all of its railroad connections. Freight for delivery to the Pennsylvania Railroad should be in the cars by 1 p. m. Equal promptness is promised in connection with inbound shipments.

Employees' Participation In Management

Special Committee of the National Economic League Reports on Employee Representation

THE FOLLOWING QUESTION was submitted to vote of the National Council of The National Economic League in October, 1919: "Should there be active participation by employees or representatives of the employees in all the problems of management affecting the worker?" Five hundred members voted, 78 per cent of them in the affirmative. A special committee of 77 members was recently asked to report on what had been done in this direction up to the present time and what success had been achieved where such experiments have been tried. The report of this committee was discussed at the meeting of the Economic Club of Boston last May, the result being reported in the July number of The Consensus, the official organ of the National Economic League.

The complete report of the committee follows:

One Thousand Concerns Have Employee Representation

Your committee finds that the movement for representation of employees in the discussion and adjustment of working conditions in business and industrial establishments throughout the United States has spread rapidly and that there are, today, about 1,000 concerns which have such plans in operation. These plans are distinct and apart from trade union agreements.

We find that experiments with employee representation, particularly since the war, have convinced managements, in the majority of cases where such plans have been tried, that it is highly desirable and valuable to give employees the opportunity to be heard when conditions affecting their immediate interests are under consideration. With very few exceptions the plans in operation give employees advisory powers only; and that seems to be the most practical method of representation. There have been some failures, particularly with the plan advocated and made mandatory in most cases by the former War Labor Board. This was found to be the case in many concerns in Bridgeport, Conn.

The best results were secured where the plans were voluntarily adopted by joint effort of managements and employees. There have been few cases of failures in representation plans where employees were convinced that their employers felt a sincere desire to bring about an understanding of the problems affecting both parties to the employment contract, and co-operation in solving them.

Result of a Questionnaire

Your committee has made a study of the plans for establishing better industrial relations in several hundred business and industrial enterprises throughout this country and has also given careful consideration to statements from leading executives, economists, engineers, labor representatives and others which were sent to the committee in answer to a searching questionnaire on the subject.

The committee's report aims merely to present some of the next steps that are necessary, in its judgment, towards a more workable readjustment in industrial relations. Its proposals are offered only as a guide to intelligent judgment and experimentation for the immediate future. It has purposely avoided a general discussion of the adequacy or inadequacy of our present industrial system. It has steered away from prophecies as to the future of industry and society, confining itself merely to one specific and important phase of industrial relations, namely, that of representation of employees in management.

The committee has endeavored to learn at first hand what the actual experience with so-called industrial democracy plans has been, to learn the basis on which experiments were made, and to draw out the significant factors in the progress of representation plans. All this has been done with a practical end in view—to get all the facts and to present to the members of The National Economic League and to the public, the conclusions which the committee has drawn therefrom. The committee's conclusions are as follows:

Term "Industrial Democracy" Misleading

The term "industrial democracy" as applied to industrial relations is unsatisfactory; (a) because it is misleading if meant in a literal sense; (b) because it is too vague to define a relationship that requires exactness in its explanation and conduct; (c) because it does not adequately express the conditions of improved relationship between employer and employees. It is a "catch phrase" without precise meaning. The consensus of opinion as brought out by the committee's questionnaire, is opposed to the use of the term.

Attempts have been made by some to define "industrial democracy" as an application to industry of the principles underlying our government, and in some cases attempt has even been made to simulate the form of our federal government by establishing a "congress," made up of a house of representatives, and a senate in addition to a president and a cabinet, in the particular establishment. But such plans are constitutional governments in name only. Their only resemblance to the form of government of the United States is in the terms used. Usually in such plans the president, cabinet and senate have full power to veto the votes of the house of representatives and such veto cannot be overridden.

Another defect in these schemes is that the president is self-appointed, and himself selects the cabinet and senate; or such bodies come into existence by virtue of the positions held by the members thereof. For example, the cabinet is usually made up of the directors of the establishment, while the senate consists of the foremen or other executives.

Not Analagous to Federal Government

Experience with employee representation plans indicates that the analogy to the federal form of government is far-fetched; it indicates that terms are used loosely and vaguely, and in the end employees feel that they have been misled as to the nature of their powers. Several strikes have occurred in establishments where "congresses" were organized. In one instance the "house of representatives" left their plant because of dissatisfaction with wages and the "president" refused to allow that "house" to return. He took it upon himself to hire new employees who would make up a new "house."

Plans for representation of employees in management, profit sharing and the like, represent what may be called a democratic spirit in industry but not a democracy as we know it today.

In the opinion of the committee, it is unwise to label current plans for improving relations with employees as "democratic." It would be much more desirable to speak of them as "co-operative plans" or "mutual plans." Where em-

ployees are given an opportunity to be heard through representative committees on questions personally affecting them, it would be desirable to use the term "employee representation." The real thing sought, however, is co-operation in management.

Wage Standards Must be More Definite

Your committee believes it is highly important that there should be a definite agreement as to what constitutes a fair standard upon which to base wages. Some believe that wages should be based on the cost of living, others on standard of production and efficiency. Secretary of Labor Davis talks of a "saving wage"; organized labor talks of a "living wage"; others argue for or against a "minimum wage." Our present standards, policies and conditions as they affect compensation for labor, must be readjusted so that the employment relation may become more equitable from the viewpoint of the wage-earner, the employer and the community.

Such standards have formerly been set up in arbitrary fashion. Under the modern processes of readjustment they will have to be formulated jointly. In other words, whatever standards are set, they will be predicated on the co-operation of those for whom they are intended. The employment relation will then be a mutual one, and its objects will be to produce honest goods abundantly and to sell them cheaply to the largest possible number of people.

Employees Generally Do Not Desire Control

It is the opinion of your committee that proprietorship will and should retain its legal rights, but that it should recognize more keenly its moral obligations to its employees and the public. The committee finds no indication that employees generally desire arbitrary control, are interested in assuming the responsibilities of ownership, or could exercise such control efficiently without long experience and training in management.

Neither are employees, in the opinion of this committee, interested in assuming the financial risks of an enterprise. On the other hand, as a well-known employer puts it, they do not want to be "mere pawns in a large financial game." They want to know something of the balance sheet of the business and whether they have a fair place in relation to it. They want to know whether management is efficient, and they want the opportunity to be heard when, in their opinion, management is incompetent, or is pursuing an unjust or an inexpedient policy.

Employees Should Have a Voice in Management

Your committee believes that employees should have a voice in all questions of management affecting their interest and welfare; that they should be consulted on all questions related to adjustments of conditions under which they work. This refers to working conditions, wages, hours of labor, discipline, safety and the like.

On larger questions of policy, such as selling, purchasing, and finance, your committee believes that it would be impracticable and demoralizing, even in moderate sized establishments, to adopt the plan of employee participation in final decisions. Good management, which means good leadership, requires no radical changes in present methods of administering business and industrial enterprises. It recognizes the importance, however, of taking every individual in the organization into its confidence and of working out ways and means whereby happy relations may be permanently maintained, and mutual contributions secured.

Personnel Management

In large organizations, especially where contact between the responsible proprietors or their responsible agents and their workmen is very limited, there is a loss of the "human element" in industrial relations. There is usually an effective transmission down the line of pressure for lower costs, especially direct labor costs, but a very meagre transmission of consideration for the needs, weaknesses and interests of the employees such as naturally arise from a sense of moral responsibility and sympathy on the part of proprietors who keep in close contact with their working people. Subordinate managers and officials may not assume services or liabilities toward workers which a proprietor would feel impelled by his sense of self-respect to do, nor are they in position to take into account broad questions of morale, ultimate results, and good will as against immediate exigencies. Yet these matters are vital in maintaining healthy industrial relations. This function, impossible to the distant proprietor or chief executive, must somehow get performed, lest the neglect of it breed a condition inimical to the organization and the public welfare.

In many cases this difficulty of large organizations has been met by appointing labor or personnel managers to represent the employer's good will, his sense of responsibility, his self-respect and reputation, and his far-sighted business sense.

Joint Councils or Committes Desirable

Joint councils representing the management and employees to consider problems of mutual interest, are highly desirable in that they bring about better understanding and appreciation of mutual rights, obligations and interests. However, in the case of administrative or executive functions of management, which are expert matters, such functions cannot be delegated successfully to employees, and are not expected to be delegated.

Executives and Employees Must Know Economic Facts

Another step which your committee considers vital to proper readjustment is instruction of both employees and executives in the economics of business and industry. A more thorough knowledge of economic facts as a means of reducing misunderstanding, prejudice and friction cannot be stressed too strongly. The economic laws which govern business and industry are too often ignored or are presented in distorted interpretations that serve only to increase difficulties. Often, the only instruction in economics received by employees is from prejudiced, partisan, unreliable sources; and no attempt is made by management to present its own case or information properly, or to make clear the basic, impersonal laws which govern all business enterprise, however, owned or controlled.

The problems of management should be no mystery to those who labor in a common enterprise. Opening the opportunity for employees to understand the possibilities and limitations of business enterprise is a necessary step to intelligent readjustment.

Employees Should Have Some Financial Interest

It is desirable, your committee believes, for employees to have some financial interest in the enterprise in which they engage. Such investments, in its opinion, may best be made in the form of stock ownership where such ownership is in the nature of a properly protected investment and is free from speculative dangers. The individual holdings of employees may be small but they create an interest in the success of the business that is desirable.

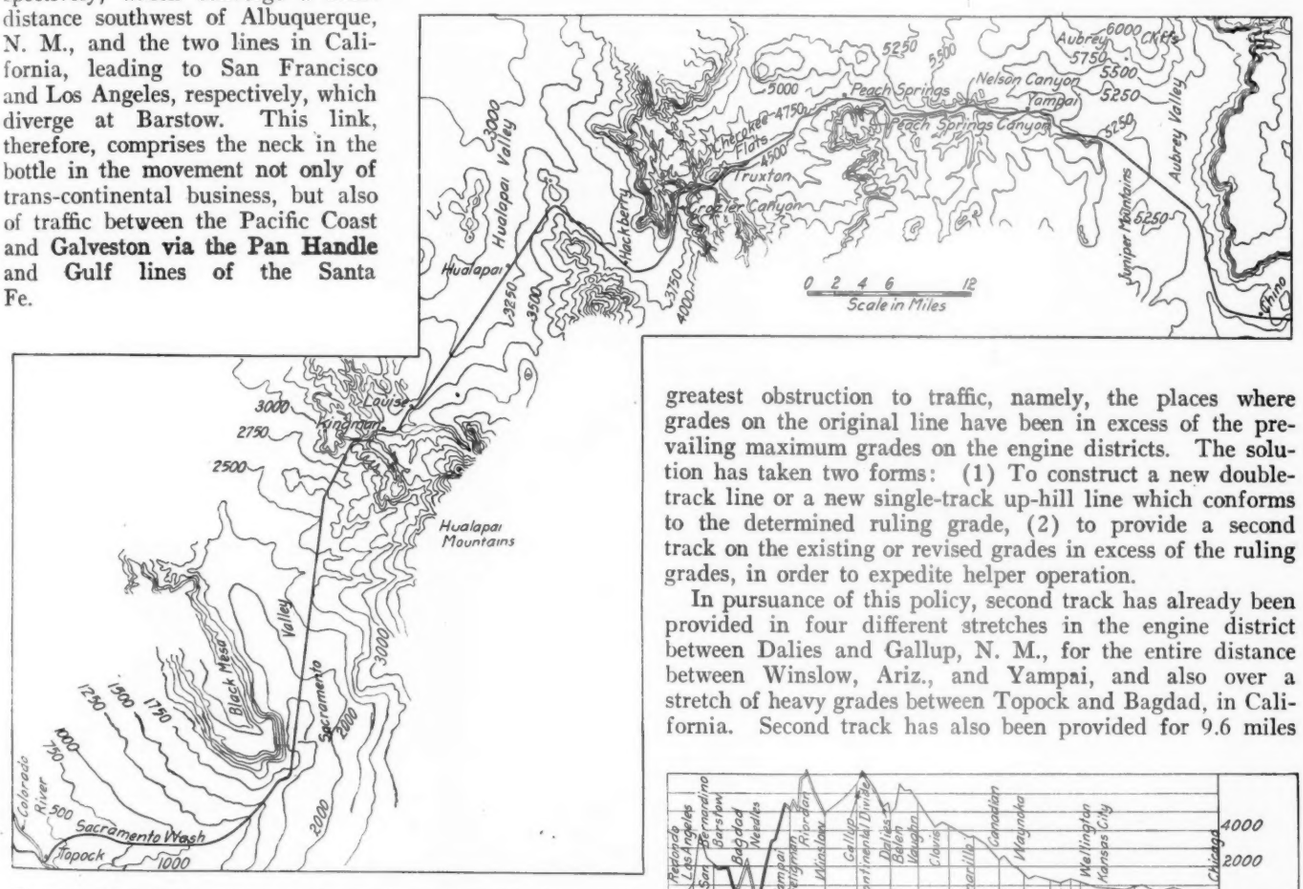
Whatever the program of industrial relations, it should be flexible enough to adapt itself to changing conditions. A rigid policy cannot be a permanent success.

Neither can permanent success be achieved by a policy built around one personality. Full co-operation from all in an enterprise comes from mutual exchange of ideas and free expression of personality among those employed. A one-man policy is generally autocratic or paternalistic. Progress in labor relations does not lie in this direction.

Santa Fe Is Building 212 Miles of Second Track

Grade Revision Forms an Important Feature of Improvements Now in Progress in the Southwest

SINCE THE SPRING of 1922, the Atchison, Topeka, & Santa Fe has authorized and placed under contract the construction of 212 miles of second track in New Mexico, Arizona and California, at a capital outlay of about $14,000,000, this work forming an important feature of the progressive project for the double tracking and grade revision of the 723 miles of line between Dalies, N. M., and Barstow, Cal. This portion of the Santa Fe's transcontinental line comprises the connecting link between the two great eastern routes via Trinidad, Colo., and Belen, N. M., respectively, which converge a short distance southwest of Albuquerque, N. M., and the two lines in California, leading to San Francisco and Los Angeles, respectively, which diverge at Barstow. This link, therefore, comprises the neck in the bottle in the movement not only of trans-continental business, but also of traffic between the Pacific Coast and **Galveston via the Pan Handle** and **Gulf lines of the Santa Fe.**

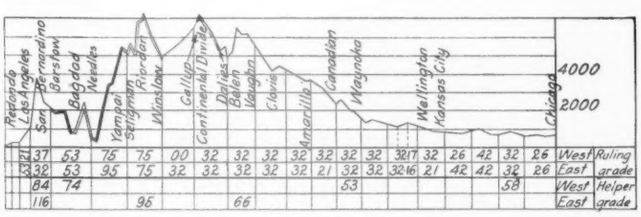


Contour Map Indicating the Character of Country Traversed By the Santa Fe's Lines Between Yampai and Topock

The location of the Santa Fe in western New Mexico, across the state of Arizona, and in southeastern California, is one devoid of the mountain crossings such as are encountered immediately west of Barstow, and east of Dalies; nevertheless it presents obstructions to the free movement of rail traffic in the form of a rugged, broken plateau of high altitude, reaching an elevation of 7,259 ft. at the continental divide in eastern Arizona and a second summit of 7,300 ft. just west of Flagstaff, with a sharp descent to an elevation of only 505 ft. at the crossing of the Colorado river at the California-Arizona state line. In the two engine districts between Dalies and Winslow, it was possible to locate a line with grades not exceeding 0.6 per cent. Between Winslow and Seligman the ruling grades are 1.42 per cent in both directions with an eastbound pusher grade of 1.8 per cent for 23 miles east of Ash Fork. Between Seligman and Needles, the ruling grade is 1.42 per cent against westbound movements and 1.8 per cent against eastbound trains, while the location at a lower altitude between Needles and Barstow, presents a rather choppy grade line of 1 per cent maximum in both directions, except for two westbound pusher grades of 1.4 per cent.

In general the policy pursued in the improvement of the line has been to give preferred attention to the points of greatest obstruction to traffic, namely, the places where grades on the original line have been in excess of the prevailing maximum grades on the engine districts. The solution has taken two forms: (1) To construct a new double-track line or a new single-track up-hill line which conforms to the determined ruling grade, (2) to provide a second track on the existing or revised grades in excess of the ruling grades, in order to expedite helper operation.

In pursuance of this policy, second track has already been provided in four different stretches in the engine district between Dalies and Gallup, N. M., for the entire distance between Winslow, Ariz., and Yampai, and also over a stretch of heavy grades between Topock and Bagdad, in California. Second track has also been provided for 9.6 miles between Daggett, Cal., and Barstow, which is used by the trains of the Los Angeles & Salt Lake, in addition to those of the Santa Fe.



Condensed Profile of the Santa Fe. Heavy Lines Indicate Location of Recent Second-Track Work. Double Lines Signify Second Track Previously in Service

It is in amplification of the second track numerated above, that the Santa Fe has authorized additional second track construction covering 115 miles between Yampai and Topock, completing second track in the engine district between Seligman and Needles and for 65 miles between Daggett and Bagdad, completing second track in the engine

district between Needles and Barstow. More recently 32.6 miles of second track has been authorized in the vicinity of the continental divide near Gallup, and 8.6 miles between Dalies and Rio Puerco.

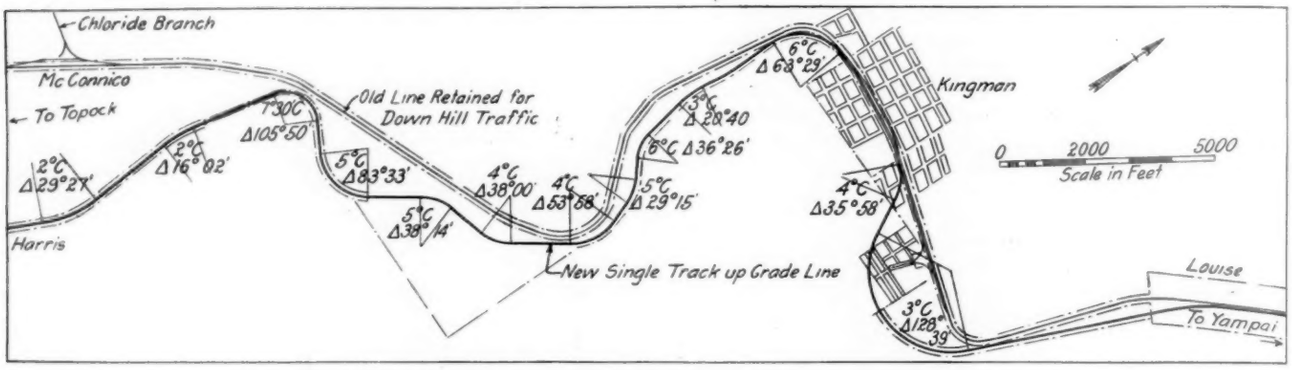
Line From Bagdad to Daggett Lies in Desert

The line between Bagdad and Daggett is in a desert country. West of Bagdad the line ascends from elevation 787 on a grade of 1.4 per cent and a rather crooked alinement to a saddle at Ash Hill with an elevation of 1944. Beyond this point the grade is undulating with maximum grades of 1 per cent in both directions as far as Lavic where the line is in a valley involving considerable curvature, but for the remaining distance, approximately 33 miles, to Daggett, the railroad traverses a desert basin with long tangents and grades that rarely exceed 0.5 per cent. At Troy a dry lake several miles in extent is crossed at a dead level.

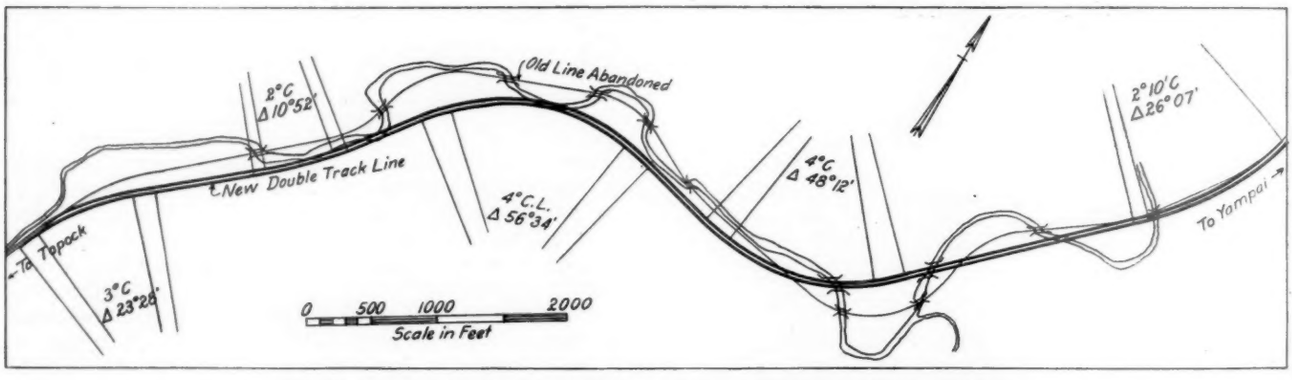
Over all but 11 miles of the entire distance between Bagdad and Daggett the second track is being constructed alongside the old line, and of this 11 miles in which diversions from the old line are made, all but about three miles occur in the ascent from Bagdad to Ash Hill. This includes 3¾ miles of relocation for both tracks and a 4-mile cut-off for the purpose of saving distance and reducing curvature on a new eastbound or down-hill track at a point where the old line makes a wide detour with heavy curvature to develop distance for the ascent. Two miles of the old line, which is being retained for the up-hill or westbound traffic, will also be revised to improve the alinement.

A large part of the grading will be light earth work, particularly in the desert basin location. In the level stretches across the dry lakes, the line is placed on an embankment 4 ft. high to keep the track out of the water and protect it from wash at the times of occasional rainfall when the lake bed may be covered with from 6 in. to 8 in. of water. Between Bagdad and Ludlow the grading is much heavier and considerable rock work will be required.

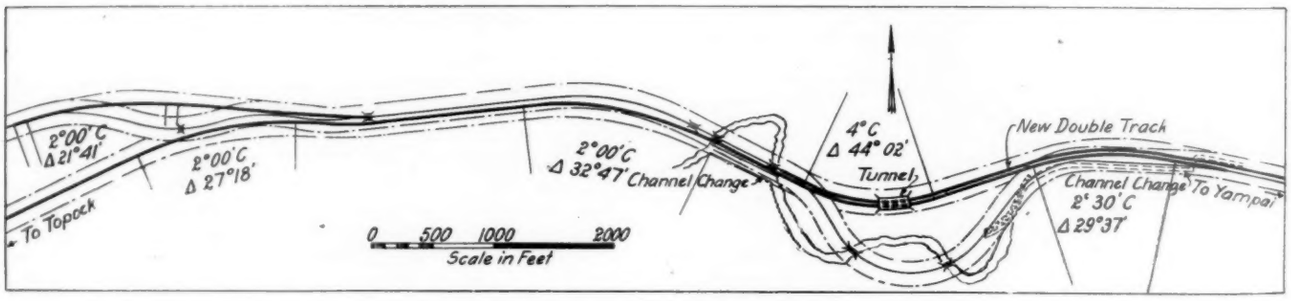
A noteworthy feature of the country traversed, which has an important bearing on the prosecution of the construction work, is the extreme heat occurring during the summer months. The temperatures are probably as high as are encountered anywhere within the United States. In fact, the



The New and Old Lines at the Upper End of the Kingman Canyon



The Re-location in the Peach Springs Canyon Eliminated Eight Bridges



Part of the Re-location in Nelson Canyon

heat is so great that it is virtually impossible to work either men or horses during the summer. Between Newberry and Danby, a distance of 87 miles, no water is to be had, water stations between these two points being supplied by water trains.

Heavy Grades Between Topock and Yampai

By far the most unfavorable portion of the entire line between Dalies and Barstow, from the standpoint of operation, is from Topock to Yampai, where a climb of 5,085 ft. is made in 115 miles, or an average ascent, disregarding the stretches of slack grade, of 45 ft. to the mile. The prevailing maximum eastbound grade is 75 ft. to the mile, or 1.42 per cent with several short stretches of 95-ft. or 1.8 per cent grade, but these 95-ft. grades are distributed in such a way as to make helper operation impracticable, thus making 95 ft. the ruling eastbound grade. The fact that this ruling gradient exceeds by 10 ft. per mile that on any other engine district between Chicago and San Francisco, and that only one other engine district, namely that between Winslow and Seligman, exceeds 53 ft. to the mile, emphasizes the obstruction which conditions in this engine district have imposed on traffic. But the situation is still further aggravated by the fact that this territory comprises part of an engine district 148 miles long (Needles to Seligman), and that the preponderance of the traffic on the line is in the direction opposed to the maximum grade. Thus, the eastbound freight traffic during periods of heavy fruit movement from California amounts to from 16 to 20 trains per day as compared with only 10 freight trains westbound. Moreover, the passenger traffic, averaging 5 trains each way per day, is greatly augmented during periods of heavy travel to the extent of imposing a serious problem on the operating department.

Coyote Shot in Kingman Canyon Results in Large Fragments as Indicated by Comparison with the Figure of the Man in the Foreground

Tunnel Construction in Nelson Canyon

To Effect Marked Economies

Santa Fe type locomotives with a maximum drawbar pull of 75,000 lb. are rated at only 1,600 tons over the 95-ft. grade, as compared with 2,000 tons on the 75-ft. grade. Based on this difference studies for the justification of expenditures for grade reduction in this district, showed an annual saving in the reduced number of trains to the amount of $402,000, with a further saving of $152,000 from a reduction in the number of westbound light engine movements.

In the Summit Cut Near Louise

The estimated capital expenditure for second track between Yampai and Topock without change of grade is $7,161,000 while the added cost to eliminate grades in excess of 1.42 per cent, which occur wholly within the territory between Yampai and Griffith, is only $1,575,000 thus indicating that the annual saving in operation, with adjustments for increased length of line, etc., is equal to 37 per cent on the added investment.

The first 40 miles of the ascent from Topock at elevation 505, to Griffith at elevation 2,617, traverses the Sacramento wash, a wide basin that slopes upward from the Colorado river, on a gradient which readily permitted the location of the railroad on a 1.42 per cent grade. The line is entirely in open country except for a short distance at about the halfway point, where it traverses a narrow valley in rounding the shoulder Black Mesa. The work on this portion of the line imposes no particular difficulties other than those arising from excessive summer temperatures. Accordingly the work between Yampai and Topock was divided into two projects, that east of Griffith being started in the spring while that west of Griffith was postponed until fall.

East of Griffith the line may be compared with a series of steps in which the treads are represented by a succession of

plateaus or flat basins of considerable extent, the ascent from one plateau to the next being effected by canyons in which the original line was located on grades varying from 1.42 to 1.8 per cent. The first step in the ascent is made up Kingman canyon, over a distance of about seven miles to the Hualpai valley, which extends eastward about 25 miles at an elevation of from 3,300 ft. to 3,700 ft. The next ascent traverses Crozier canyon, and reaches the Cherokee Flats, having a width of about 5 miles at elevation 4,400. The last stage of the ascent extends up Yampai canyon to a summit at Yampai at elevation 5,580 in a saddle between the Juniper mountains and the Aubrey cliffs, whence the line descends eastward into the Aubrey valley. In the ascent of the Yampai canyon, covering about 18 miles, only about 1 mile of the old line was on grades in excess of 1.42 per cent, but at two points in this distance, namely in the portions known as the Peach Springs and Nelson canyons, the alinement was such as to call for revision by means of relocations.

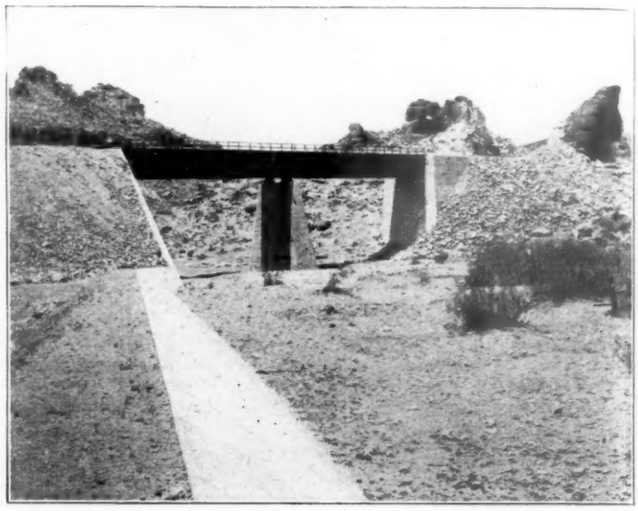
In practically all of the valley locations of the line where the old line is on a grade not in excess of 1.42 per cent, the second track is built alongside the old line. However, in the case of the several canyon locations, where the problem was to reduce the grade to 1.42 per cent, extensive relocations were made.

Line Relocated in Kingman Canyon

The largest single relocation is in Kingman canyon where a new single-track line has been constructed for the nine miles between Griffith and Kingman. With the two lines at the same grade in the yard at Kingman, the 1.42 per cent grade was obtained on the new line by the development of greater distance and by supporting the line on higher ground beyond the mouth of the canyon for a distance of about 4 miles, where the old line contains considerable slack grade. The new line is 1,148 ft. longer than the old one, and the more difficult location against the side of the canyon entailed an increase of 432 deg. 33 min. in curvature and the use of one 7-deg. 30-min. curve, as compared with a maximum of 6 deg. in the old line.

In a shorter change between Kingman and the head of the canyon at Louise, it was necessary to make the new line 1,527 ft. longer and to introduce additional curvature to the extent of 84 deg. 20 min. in a total distance of only about two miles.

One of the most interesting relocations was effected in the Peach Springs canyon to improve the alinement, where by placing the new grade at a higher elevation in the south side of the canyon and by making a change in the channel of the waterway, it was possible to avoid all but two crossings of the stream which is crossed 10 times by the old line. Thus the new line has one 90-ft. and one 80-ft. girder span, whereas the old line contained nine 70-ft. spans and one 60 ft. span. The new line is also shorter than the old one and contains 162 deg. less curvature.



Concrete Blanket Provided in Connection with Bridge Work in Kingman Canyon

Between Fields and Nelson, the old line occupies a crooked canyon involving a series of "S" curves and repeated crossings of the waterway, which led to frequent trouble from wash. This location is replaced by a new one for both tracks at a higher elevation which cuts through the shoulders of the canyon to secure better alinement and avoids several channel crossings by the making of a number of channel changes. One of the shoulders in the canyon is pierced by a tunnel 350 ft. long, the only one in the entire project. One consideration prompting a new location in this case arose from the difficulty imposed by two narrow through-rock cuts, the widening of which would have introduced serious hazards to the operated line during construction.

The New and Old Lines at the Head of Kingman Canyon

The material encountered throughout the length of the construction territory is of a widely varying nature. The valleys, basins or washes, comprise enormous beds of sand and gravel,

and at Hackberry a gravel bed was developed as a source for all the ballast required for the track work between Griffith and Yampai. In the vicinity of Yampai, the rock is a red wall limestone, in Peach Springs canyon, lava, and in Crozier canyon, basalt and granite, while in Kingman canyon the formation comprises alternate layers of volcanic tuff and massive brown lava. Considerable difficulty was encountered

Near the Lower End of Nelson Canyon. New Uphill Track on the Left. Re-located Downhill Track on the Right

in some of the cuts because the rock broke in fragments of excessive size. This is illustrated in one of the photographs.

The grading included 1,043,000 cu. yd. of earth embankments built by teams, and 742,000 cu. yd. of embankment built by steam shovel and train haul, 29,000 cu. yd. of excavation in earth, 8,400 cu. yd. in loose rock, and 473,800 cu. yd. in solid rock. The work was handled according

A Wide Variety of Rock Formation Was Encountered in the Work

to a variety of methods with an equal variety of equipment. Considerable of the train haul was handled with narrow-gage equipment, but a large amount of material was hauled over standard-gage tracks for considerable distances, a total of 406,120 cu. yd. being hauled more than four miles. Of this amount 225,000 cu. yd. for a large embankment near Fields was handled over the main line from a borrow pit near Nelson. In this case the contractor supplied the equipment and the engine crews for two trains, the railroad company furnishing the train crews.

The heaviest grading was in Kingman canyon. In addition to a large amount of rock excavation required to cut a roadbed in the side of the canyon, several high embankments were required. Two of these, crossing branch canyons leading off to the south, required 150,000 and 185,000 cu. yd. of filling respectively, the material from the latter being taken from a borrow pit in the bed of the canyon about one-half mile south of the line. Rock excavation methods varied with the character of the material encountered. Because of the variation in the cost of the solid rock excavation, it was found desirable to divide the construction territory into five different zones in order that the contractors might submit separate unit bids for the rock excavation in each zone.

Encounter Much Trouble From Wash

In the open valley location, characteristic of so large a part of the Santa Fe Line across New Mexico, Arizona and southeastern California, the lack of well-defined waterways has

led to much trouble from wash at times of the rare though exceedingly heavy rains. As a consequence it has been necessary to provide extensive embankment protection. For example, where the railroad lies across the natural drainage, this has been given the form of rock sheer dams extending for 100 yd. or more from the track on the upstream side in the form of a "V," as a means of concentrating the flow of water at the embankment opening. In other cases the embankment has been protected by a concrete blanket six inches thick, reinforced with chicken wire and strengthened at the base with a foot wall 12 in. thick.

In Crozier canyon, a change of alinement which brought a considerable proportion of the embankment close to the waterway made it necessary to provide protection in the form of a concrete blanket 31 ft. wide, and as this lies against a new embankment, it gave rise to considerable uncertainty as to its security because of the possible effect of the embankment settlement. This blanket was made of a thickness varying from 6 in. at the top to 9 in. at the bottom, reinforced in both directions by ⅜ in. bars, spaced 12 in. center to center; to insure a certain degree of articulation in the event of settlement of the embankment, the blanket was divided at intervals of 10 ft. to 12 ft. by a joint separating the concrete but providing for a certain degree of continuity through the use of characteristic sheet metal connections.

Waterway openings in nearly all cases comprise one or more spans of plate girders or Massey reinforced concrete pipe in diameters up to 48 in. Between Fields and Yampai, a 42-ft. deck plate girder span on sandstone abutments was replaced by a 30-ft. semi-circular arch built inside the faces of abutments. As the extension for second track is on a skew, whereas the portion under the old track is square, it was necessary to construct a curved portion to connect the two sections.

The longest bridges were required in Kingman canyon, where two structures required two spans of 100 ft. each and a third bridge required a single span of 100 ft. Two of these bridges are located in embankments of considerable height requiring high abutments of the mass wing type.

Several Channel Changes Made

Changes of alinement and provision for channel changes in a number of cases resulted in the releasing of a considerable number of girder spans from the old line, advantage being taken of this by adopting span lengths at other points that would enable these old spans to be utilized at some point within the limits of the second track work. In addition to the channel changes in the Peach Springs and Nelson canyons already referred to, a change of channel in Kingman canyon just west of Kingman is of interest. Here a change which moved the confluence of two drainages from one side of the road to the other reduced the waterway requirements from five 100-ft. spans to two spans of 100 ft. This change involved considerable rock excavation, but the material removed proved valuable as riprap for the old line at this point, which had been subjected to severe wash.

The roadbed for single track has a standard width for embankment of 20 ft. plus 5 per cent of the height, if made with scrapers, or plus 10 per cent of the height, if made with cars or wagons. In cuts, the width at the roadbed level is 24 ft. in rock and 28 ft. in earth. The spacing of double tracks is 14 ft. except where widened for water cranes or for other reasons. The roadbed in earth formation will be oiled from the ballast line of the top of the embankment. Curves are compensated 0.05 per cent per degree from the ruling grade of 1.42 per cent, and through passing tracks and for a distance of 500 ft. at each end, the gradient is reduced to 1.1 or 1.2 per cent.

The contract for all grading and bridge work on the 75-mile between Griffith to Yampai was awarded to Sharp and Fellows of Los Angeles. Work was started on March 14, 1922, and the first section of completed work, namely the 24 miles between Louise and Hackberry, was turned over to the operating department on August 27 of last year while the last section was ready for use in June of this year.

The line within the limits of the construction territory is being provided with automatic block, color-light signals for double-track operation. The Chloride branch, which leaves the old main line at McConnico at a point where the new line is inaccessible, is operated by trains that start from and tie up at Kingman. This has made it necessary for the inbound branch line trains to operate against the current of traffic over the old or down hill line for the four miles from McConnico to Kingman, and accordingly provision has been provided for signal protection of this portion of the line for operation in both directions.

The double-track construction work on the Atchison, Topeka & Santa Fe is under the general supervision of C. F. W. Felt, and G. W. Harris, chief engineer and assistant chief engineer of the Atchison, Topeka & Sante Fe system, respectively, and under the more direct supervision of R. B. Ball, chief engineer, Coast Lines, Los Angeles, Cal. L. G. Harris, Kingman, Ariz., is construction engineer in charge. The engineering work is subdivided into four residencies, each with an assistant engineer in charge, and a field party consisting of one instrumentman, one rodman and two chainmen. In addition, the construction engineer is assisted by a construction accountant, a construction roadmaster, a construction trainmaster, and a construction signal supervisor. One interesting fact concerning the conduct of the work, is that no material yard has been maintained, arrangements having been made to unload material at the points where it is to be used, immediately upon delivery. One exception to this was found in the case of rail, which was held in storage at Seligman until required. All track work was done by company forces, and required the employment of an average force of about 500 men.

A Concrete Blanket 31 ft. Wide Was Laid Against the New Embankment in Crozier Canyon

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THE INTERNTIONAL-GREAT NORTHERN'S petition for permission to remove its general offices and shops from Palestine, Tex., to Houston, has been denied by the United States District Court at Houston, Tex. The headquarters of the road were located at Palestine when the road was built, one provision of the charter being that in consideration for land grants which the road received they should remain there permanently.

The Value of a Single Minute—Sixty Seconds

Saving Minutes Saves Money—Notes on Varied Instances of Wasteful Habits in Train Running

By Harry W. Forman

THE INSPECTOR of train service who finds himself in any degree wearied by the constant necessity of checking up what may be called small things may do well to change his mode of attack—change it by changing the name of his processes. Measure everything by the saving of time. "Saving minutes" is a suitable topic for a good many of his lectures. It will, of course, be a change in name only; but this bit of camouflage is warranted by the necessity of the case. When you cannot go through a hill, go around it; when you cannot penetrate a trainman's cranium, try the other side. When his mind resists the introduction of a rule try to aid him to think for himself by challenging him to save, on the next trip, the five minutes which you have shown him that he has wasted on this one.

Do Not Despise the "Literary Feller"

Examiners should examine themselves before starting out to teach others. Style—the proper use of words—can be strengthened by reading. Read Blackstone and Charles Dickens—Blackstone because his selection of simple words and lucid explanations makes it impossible to misconstrue or misunderstand his teachings and principles; Dickens because of his habit of reiteration. Reiteration is a very necessary qualification, without which no supervisor or train rule examiner can hope to be a success; and this is not inconsistent with "saving minutes." Having found the right words in which to instruct or advise a man (or men) it is possible to repeat, *as many times as may be necessary,* and yet beat the non-repeating talker who does not take the pains to put every one of his deliverances into the language best fitted to find an easy entrance into the conductor's or the brakeman's mind. To inculcate the habit of saving minutes, the trainmaster will do well to set an example himself. Do not waste your men's time by lecturing them except in a way that they will readily see means business.

How Can We Best Measure Time?

The question, "What is a minute?" is important, when analyzed. In handling the Twentieth Century Limited, quite likely the answer would be that the saving or recovery of a minute is of great importance; on a freight train possibly the crew would regard the loss of a minute as too insignificant to notice, a help to them in fact, in increasing the overtime account; yet it is and always must be of vital importance in the proper handling of all trains. Many times another train is involved. The loss or gain of every possible minute, which amounts to hours when added, may make all the difference in the world in the final summing up. Perhaps there is no one subject deserving of more serious consideration and checking up than the unnecessary loss of even sixty seconds of time. Has anyone ever calculated the actual money lost by reason of the wasting of a minute's time here and there? If one will keep his eye on the second-hand of his watch until it has moved entirely around the circle, he will agree that the long-neglected little minute is deserving of most careful attention.

No doubt many are familiar with the case of a suit having been brought in court for damages because a drawbridge was kept open for five minutes, preventing a fire engine from crossing. The defense contended that since the draw was open only five minutes, they were in no way responsible for the loss which resulted; that such lapse of time was insignificant. The attorney for the plaintiff requested that the jurymen hold their watches in their hands for five minutes, then rested his case without further argument. The jury found for the plaintiff.

Optimism vs. Pessimism

If crews would keep prominently in mind the thought that they can and should keep on time, instead of starting out with the conviction that arrival at destination on time is impossible, more favorable results would obtain; but as long as the query, "What is a minute?" is answered pessimistically instead of optimistically, it may be expected that unsatisfactory runs will be common.

With employees who have to deal with passengers the *state of mind*—an element which must be considered even if the individual does not have to answer more than two questions in a whole day—is of the highest importance, and employees should be induced to measure themselves with that feature in mind. Assume that every passenger is more or less anxious. It is hard enough to satisfy him at best; but without a desire to please, it is impossible.

There appear to be two distinct classes of passenger crews—the optimistic and the pessimistic. A small group of passengers, being uneasy as to whether or not connection would be made with another line, interviewed the conductor. He informed them in a hearty, reassuring manner that we would get through on time; indeed, that there would be time to spare. The train did get through on time; but the point is that whether his prediction was true, or had to be corrected later, the passengers were able to enjoy their trip without a fear hanging over them.

In another case we had a pessimistic crew. They seemed to have started out fully convined that since they had a heavy train, their schedule was fast and the track in places not the best, they were foredoomed to lose time; and time *was* lost. They did not have the slightest conception of the value or importance of gaining a minute here and there. The slow, discouraged movement and attitude of this crew was most disheartening to observe. A minute or so could have been saved in switching, another minute in cutting off the helper and allowing it to run in on the siding instead of stopping at the far end, waiting for it to pull by the switch, handle the derailer and back in; and several minutes' delay could have been avoided had more interest been taken in unloading and loading baggage and express at stations. When the attention of the conductor was called to these possible savings in time he replied, "Oh, what's the use? No one seems to care whether we keep on time or go in late. Look at this; here is a train order which will delay us three minutes at least." I suggested to him that perhaps the dispatcher had himself become discouraged and felt that since this crew could not keep on time he would be justified in giving help to others who were doing better.

Is the Situation Hopeless?

Readers who have followed my two preceding articles (February 10 and July 7) may possibly begin to think that

the situation is hopeless. It is not so by any means. A very great number of employees are conscientious and can always be depended upon to obey rules and do the right thing at the right time, and in a safe, sensible, practical way. It is the delinquents who must be considered, those indifferent or thoughtless ones who by their acts or failure to act are responsible for the loss of life and destruction of property which occasionally get us into the newspapers.

I shall have to qualify in a slight degree my statement about hopelessness. I must admit that no one of the present generation is likely to live to see engine whistle signals—particularly the public crossing whistle—sounded in a uniform manner. Can it be that correct whistling is considered by the majority as unimportant or impossible of achievement? Invariably I have taken the opposite view and I have instructed accordingly. There is no reasonable excuse for the vagaries which are tolerated on so many different roads. What complete lack of system! It is doubtful if any six engineers on any given district of any railroad observe uniformity, or make this signal properly; seventeen freak signals were counted on a recent trip. Somebody may claim that no uniformity can be expected under present instructions. Some roads require this signal to be sounded continuously from the whistle-post to the crossing. How absurd, in the case of a slow freight train ascending a heavy grade. Others specify that only three seconds shall be consumed from start to finish. If runners cannot be trained to use the present signal in good shape, perhaps the thing to do is to change the code rule. If a long sound is the thing, why not prescribe two long, one short and one long blast? The last one could be made of longer duration than either of the others.

On one line, over which I was traveling, having noticed that the engineman sometimes sounded three short and one long, and at other times four short blasts, I inquired of the conductor the purport of such signaling. He replied that it was the road crossing whistle; and he looked at me suspiciously as if he doubted whether I ought to be traveling on a pass; doubted whether I knew anything about railroading.

Some Instances of Thoughtlessness

On several recent trips cases were noticed of slovenly observance of rules and negligence of such character that I am forced to the conclusion that some employees either do not think or do not care. The following is typical of infractions which were jotted down at the time:

A conductor and a flagman (both smoking) were noticed engaged in conversation in a sleeper four cars from rear of train.

A flagman was observed taking his meal in the diner without having been relieved by another trainman.

Passengers sat in a Pullman car for an hour at a time without once having opportunity to ask a question of the conductor or a trainman, unless they sent for him. After having once checked up, train conductors rarely pass through sleepers afterward to see if all is well with their passengers, and to give desired information as to connections, etc.

An engine broke down within sight of a terminal. An experienced machinist who was riding as a passenger, offered to put the engine in shape in 15 minutes' time, so that it could go in with the train using one side. The engineman declined the proffered help, making a slurring remark about the inefficiency of the new men who took the places of the striking shop crafts. After about an hour and forty-five minutes a machinist arrived on a yard engine and repaired the engine in eleven minutes. More than 100 passengers missed connections needlessly.

After standing at a station two minutes, an engineer whistled off but did not start thereafter for some 15 minutes, on account of a defective engine. He did not signal for rear flag protection. This occurred on an obscure curve where there were numerous helpers and other trains.

An engineer recalled the flagman but did not start for 10 minutes after he had returned. This engineman failed to signal the flagman to go back again.

An important limited train which was less than 10 minutes late had to stop and wait two minutes because of a time order issued for it by the dispatcher. When a train is that near to its schedule it should be let alone.

A Pullman porter took a quart bottle of whiskey out of the suit case of a passenger during the night, drank most of its contents and became gloriously intoxicated. His car was not properly cared for the next day.

A track walker was observed diligently inspecting a derailer less than one hundred feet from his home; this in order that the roadmaster might know he was strictly on the job should this officer happen to be riding the rear of that passenger train.

Our train lost one hour and fifteen minutes' time, on a run of 700 miles, principally because of the slow movement of inspectors and supplymen at inspection stations. There were not enough men at hand, and the facilities were inadequate.

Room for the Exercise of Discretion

As our train was moving along at ordinary speed on a 1½ per cent up-grade, we passed a doubleheader freight train standing on a siding. Immediately after we cleared the switch this train started out. At the next station we met a freight train. By pulling out immediately behind us, this doubleheader unquestionably permitted the opposing freight to continue its trip much sooner than would have been the case had the waiting time of 10 minutes on the siding been strictly observed. The manner in which this situation was handled impressed me as being entirely proper, when all of the surrounding circumstances were considered—daylight, good view, ascending grade, limited speed, etc. However, my view may not meet the approval of everybody. There will always be an ultra conservative element which will contend that such a lax method of handling was little short of criminal and that the men involved should have been disciplined; that if given an inch, trainmen will take a mile—would follow a passenger train in the same manner by night, in a fog, or on a descending grade. Notwithstanding these anticipated criticisms I shall maintain that under the particular conditions at the time and place, it was a good piece of railroading. I shall likewise take issue with those who so strenuously object to a more liberal use of Form 19 for train orders with no better supporting argument than just plain fear. Fear will get us nowhere; we must get down to facts, or "brass tacks" as some designate it.

Is an Improvement Possible?

After having read the foregoing, many will agree that while it is theoretically sound, and the recommendations are to be approved, it is impracticable to secure suitable men to attend to the details of supervision and that it is difficult to get rid of vicious employees, some of whom generally manage by hook or crook to keep in the clear for a number of years. Again, how can one deal with the class who mean well but forget; or the men who do not know any better; and the almost mentally worn out old employees who are approaching the age limit? A hundred questions may be asked.

It should not be necessary to go away from home to find competent inspectors. It would be a loss of time probably to search for them among that class of employees who rarely do anything exactly right themselves but spend much time, wherever an audience can be secured, in outlining for the benefit of officials just how the road should be run. More likely satisfactory officers of this kind will be found among

the employees least heard of because never in trouble, hence never in the limelight.

If records are properly kept, the vicious element will eliminate itself eventually. As to the class who mean well but forget—it is to be regretted, but there is only one answer: Find employment for them where their uncontrollable faults may not result so seriously. Men who really do not know how to handle a situation properly, should be taught how to do so.

Perhaps the saddest time of a man's life is when he has begun to realize that his boyhood dream of mastering great problems is likely never to be fully realized; that soon he must join the ever increasing army of "has-beens," lay down his tools and step across the line. Sometimes a less responsible position can be found for him. For this class, while the deepest sympathy is always felt, the situation must be faced with firmness. It is the common fate of all. Like others who have preceded us, you and I must face the inevitable sooner or later.

Just and Reasonable Wages

Early this fall railroad companies will be importuned to increase substantially the wages of train service employees. In view of all of the facts which have been presented in this and the two preceding articles might it not be asked of them, "What have you done or are you doing in the way of rendering efficient service to warrant favorable consideration of such requests?"

Reduction of Export Wheat Rates Refused

J. E. GORMAN, president of the Rock Island and acting chairman of the Western Railway Presidents' Conference Committee, has written a letter to J. L. Kennedy, chairman of the special committee of the Omaha Chamber of Commerce, stating that the Western lines decline to reduce the export rates on wheat and explaining why. The Omaha Chamber of Commerce had petitioned the railways to make a reduction of 25 per cent in freight rates on export wheat and Mr. Gorman's letter was sent following the second conference on the subject which was held in Chicago on August 16.

Mr. Gorman's letter shows that the Western railways have declined to make the reduction asked mainly because the export situation is such that the railways believe that the reduction would merely reduce their earnings without benefiting the wheat grower.

"The several railroad officials had made inquiry," said Mr. Gorman, "and all had obtained about the same character of information, and it was substantially to this effect: The European countries were favored in a wheat crop way this year. France would not be likely to import very much wheat; England, too, had favorable crop conditions at home, and all the European countries had the world's supply of wheat to draw upon.

"The price of Argentine wheat at Buenos Aires, on the Atlantic Coast, was about the same as our price at Chicago; and the rate by water from Buenos Aires to the European ports is about the same as the rates from our Atlantic ports to the same European ports.

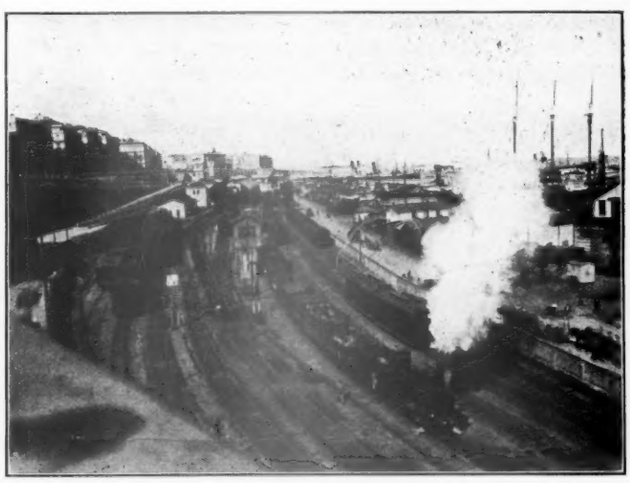
"The sales of our wheat for export had dropped off to practically nothing,—the reason for it being the people on the other side who might want to buy our wheat were unable to arrange the financial part. Also, the custom just now is for the other wheat exporting countries to fix their price based upon the offered price of the United States exporter, and they fix it just enough below our figure to take practically all of the business. Canada, too, has an immense crop of wheat and can and does undersell ours.

"So, our information is if the all-rail freight rates to our ports were reduced it would not result in a higher price to our wheat-growing farmers, but would result in a lowering of the prices of the other grain exporting countries to whatever extent our exporters might lower offers to European buyers and the relative situation after the reduction in the rates would be the same as now, but the general level of prices to European buyers would be reduced to the extent that our exporters might offer lower prices.

"Of course, we kept in mind the earnings showing of the majority of the Western roads, which is anything but satisfactory, and it is largely traceable to the reduction made in the grain rates last year, which on wheat and flour amounted to 13 per cent. It is in evidence before the Commission in case number 14,393 that if the wheat rates of the average Kansas farmer were reduced 10 per cent it would equal only $9.40 per year. This is on all of his wheat, so you can readily see that a 25 per cent reduction in the wheat for export rate, if made, could not possibly materially improve the wheat farmers' condition.

"It is argued that if the rate reductions served to move the surplus wheat out, the balance of the wheat would bring, for home consumption, a higher price. No one so far as we have heard questions that, but the men who are best informed on the subject—namely, our exporters, who have been consulted,—say the reduction in the rate would not cause the exportation of the surplus for the reason previously outlined.

"We, of the railroads, realize that the wheat farmer is in a very bad way, and the problem is under study by the government, the Wheat Council of the United States, and other capable men throughout our land. We believe, notwithstanding any expressions to the contrary, that a reduction in the wheat and flour rate for export alone, or when for both export and home consumption, would surely be followed by insistent demands for reductions in rates on other kinds of grain, and the people who would pursue the subject in behalf of other kinds of grain would have good precedent for insisting upon it. And, we simply cannot, in justice to the interests we represent start upon such a course, and we do hope those who study the problem will realize that a reduction in the rate on wheat and flour for export would be of very little real assistance in a financial way to those every one is anxious to help—namely, those of our farmers who have raised principally wheat."



International

Railway Terminal at Algiers, North Africa

Piece Work on the Pennsylvania System

Employee Representation Methods Are Extended to Adjustment of Questions Concerning It

Prior to the period of federal control the Pennsylvania Railroad used piece work extensively in its mechanical department. This practice was discontinued under the Railroad Administration, but was gradually resumed after the road was turned back to its owners. It is used more extensively in the freight car repair department than on other classes of work, but it has gradually been applied to much of the work in the locomotive department which can be more advantageously handled under piece work than on a day-work basis.

Piece work, when it was first introduced in the mechanical departments of the railways, was used only to a limited degree. Its applications, however, were steadily extended and naturally many mistakes were made, due to the more or less haphazard methods which were used to fix rates and extend the work. It was first applied before the days of so-called scientific management and accurate detail time studies. Frequently rates were established on too high or too low a basis, causing misunderstandings and friction. No provision was made for a sliding scale whereby the rates could be adjusted to changes in the cost of living.

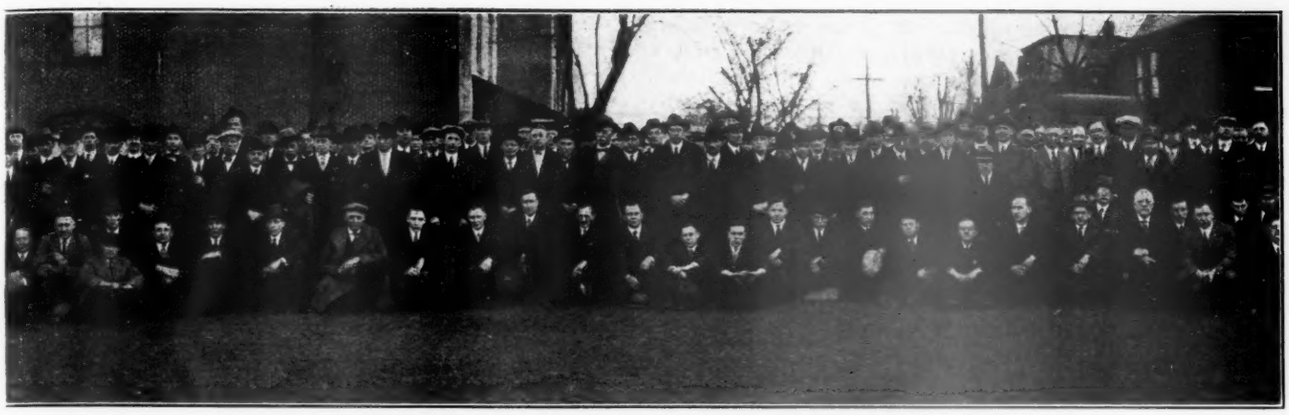
Sometimes a rate which was established upon the right basis might make it possible for an exceptional man to earn what would appear to be an unreasonably large return for his work. Shop authorities, recognizing the exceptional ability of the man, found a certain degree of satisfaction in realizing that high wages to the man were accompanied by a decreased cost to the company per unit of output, because of the lower overhead due to the increased output with the same facilities. The staff at headquarters, however, did not always appreciate this situation and frequently pressure was exerted to reduce the rates, with the result that the morale of the forces was lowered and the men established a dead line which limited their output and kept them from being penalized on a piece-work price. It is true that these practices were not general, but they did more or less to discredit piece work.

The Situation After Federal Control

The railroads recognized after the period of federal control that they must do something: First, to establish a fair price per piece, based upon careful analysis and study of the operation; second, that any question as to the justness of the price should be acted upon promptly if they were to secure the continued interest and co-operation of the workers; third, that some provision must be made for a sliding scale whereby the piece work prices could automatically be changed with any changes in rates necessitated by changed costs of living.

The Pennsylvania Railroad in reintroducing piece work provided for the sliding scale basis and recently has set up an organization for the establishment and prompt review of piece work prices and methods, with the co-operation of the

Representatives of Shop Crafts Employees Who Met at West Philadelphia, April 6,



men and on much the same basis as the operation of its employee representation plan.

Men Endorse Employee Representation Plan

It will be remembered that when the United States Supreme Court made its decision in favor of the Railroad Labor Board, as to its decision 218, Chairman Hooper of the board wrote a letter to President Rea of the Pennsylvania, concerning the attitude of the Pennsylvania Railroad under the new conditions. The management of the Pennsylvania decided that the only thing to do was to place the whole matter before the employees for their decision, feeling that this was in accordance with the spirit of the Transportation Act and the provisions establishing the Railroad Labor Board. A meeting was therefore called in Philadelphia on April 6, 1923, of all of the employees' representatives of the system, numbering in all 724. It is interesting to note in this connection, by the way, that the average years of service per man of this group was 16 years and that on the average they had actually worked in the mechanical department of the road 14 years 9 months. The situation was presented to these representatives by the management, after which the representatives of management withdrew. The men remained in session several hours, after which they called in the representatives of the management and announced that they were unanimously in favor of continuing the employees' representation plan, heartily endorsing it.

General Atterbury Addresses Men

Following this announcement General Atterbury briefly addressed the conference, after which several matters were brought up by employee representatives, including among others certain suggestions and criticisms as to piece work. As a result a conference was held at Pittsburgh on May 11 by the representatives of the management and representatives of the shop crafts to consider the best methods of adjusting disputes and questions as to piece work practices and rates. A tentative plan was suggested by representatives of management which was discussed in the joint conference only so far as an exact understanding of all of the suggested provisions was concerned. This was then left with the shop crafts representatives for consideration and discussion, after which the joint conference was resumed to consider proposed changes. This resulted in a memorandum of understanding, which provides ways and means of quickly disposing of any suggestions as to readjustment of piece work prices, or of any difficulties that may arise in the application of piece work.

Before describing this agreement it should be pointed out that all piece work prices are based upon a base rate of 50 cents per hour. The actual hourly rate is, of course, higher, and to get the actual price paid for a piece of work the base rate must be multiplied by the percentage of increase. When the hourly rate is changed it is only necessary to change the factor by which the base rate is multiplied to find the actual price paid per piece.

Piece work prices are established by a Piece Work Bureau at Altoona, which has representatives in the different regions, who keep in close touch with the developments in those regions and are called in in case of any differences of opinion or disputes. Piece work prices for the same class of work are not standard over the system, but vary according to the facilities and conditions at the local points.

The New Agreement

The procedure agreed upon by the joint conference of representatives of the shop crafts and the management provides that an employee having any complaint as to piece work prices shall take it up in writing with the foreman, who must acknowledge it in writing within two days. If the question

1923, and Heartily Endorsed the Pennsylvania Method of Employee Representation

cannot be adjusted to the satisfaction of the employee, it is referred to the local or division committee of the shop crafts' representatives, which takes the matter up with the local shop management. If it cannot then be satisfactorily adjusted, it is referred to the superintendent of motive power and by him to the general superintendent of motive power, who places the matter in the hands of the Regional Piece Work Committee for investigation. This Regional Piece Work Committee is composed of equal representation of the management and employees, the management selecting three men and the Regional Shop Crafts Committee selecting one man from each craft, or six men in all. Depending upon the question up for discussion, three of these six employees' representatives, one of whom shall be from the craft in which the question arises, are assigned to act with the three representatives of management. The members of this Regional Piece Work Committee are in all cases selected from men familiar with the piece work system, to serve for one year, and are eligible for reappointment. This piece work committee, after making an investigation of a particular case, presents its recommendations to the general superintendent of motive power, who submits any cases involving changes of prices to the System Piece Work Bureau.

If the Regional Piece Work Committee cannot agree upon a recommendation, each side submits a statement to the Piece Work Bureau. In case the regional committee does not agree to the price recommended by the Piece Work Bureau, or the Bureau does not agree to the price jointly recommended by the regional representatives and employees, the question is referred to a System Piece Work Committee consisting of four superintendents of motive power, the works manager at Altoona, one other representative to be selected by the management, and the regional chairmen of the shop committees and the general chairman of the craft from the region involved. The decision of this committee, which is made up of the same number of representatives of management and of the shop crafts, is final. All representatives have equal voting power and a two-thirds vote is necessary to reach a decision. Any member of the System Piece Work Committee, who is unable for any reason to attend a meeting of the committee, may appoint an alternate of his own choosing from his own region. Meetings of the Regional Piece Work Committee are held as often as may be necessary, at the call of the general superintendent of motive power in order promptly to dispose of questions.

This agreement, which was adopted on May 11, was signed for the management by the four general managers of the Pennsylvania System and the works manager at Altoona; also for the employees by the 34 shop crafts general chairmen of the system. The organization which was set up has only been functioning for a comparatively short time, but inasmuch as it gives the men an equal voice in the settlement of all questions involved in the application of piece work and because it also provides for a prompt settlement of any differences, it would seem that it would work to the best interests of both the management and the employees.

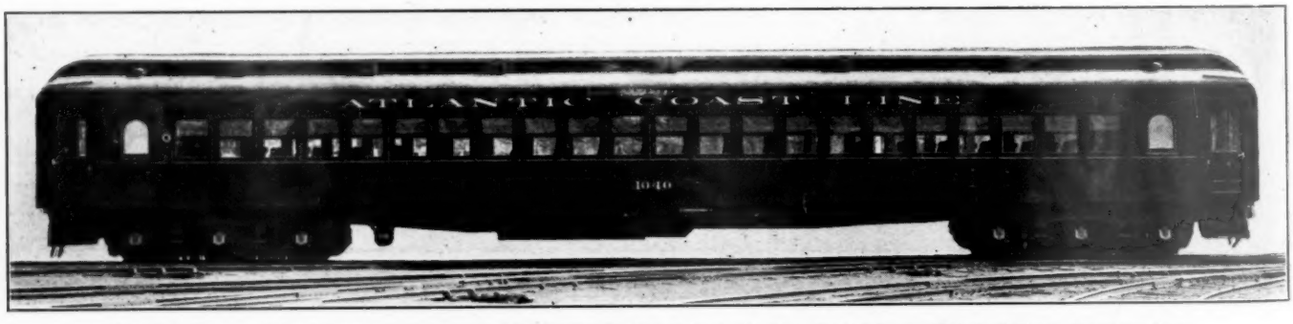
New Cars for the A. C. L.

THE ATLANTIC COAST LINE has recently received from the Harlan plant of the Bethlehem Shipbuilding Corporation, Wilmington, Del., some new passenger coaches designated as Class A-15, and some new all-steel express cars, Class C-7.

The body of the coaches is 74 ft. 4⅜ in. long and has a seating capacity for 88 passengers. The weight of the car complete is 149,000 lb., of which the two trucks constitute 46,200 lb. This is at the rate of 1,693 lb. per passenger seat. The six-wheel trucks are of the Commonwealth design, Atlantic Coast Line standard, Class T-24, having 36 in. steel wheels and 5 in. by 9 in. journals. They are equipped with clasp brakes operated by Westinghouse U C apparatus, having two 14 in. cylinders. The heating system is that of the Vacuum Car Heating Company. The lighting equipment is Stone-Franklin with Edison batteries.

Interior of Coach Having Seats for 88 Passengers

The express cars are 74 ft. 9¾ in. long over buffers, when uncoupled, and have bodies 71 ft. 5¾ in. long over end sheets, the width inside being 9 ft. ⅜ in. The flooring has a bottom course of yellow pine with a top course and grating of maple. The trucks are the same as those on the passenger coaches. The couplers are McConway & Torley latest Pitt design. The draft gear is Westinghouse friction type N-10-F.



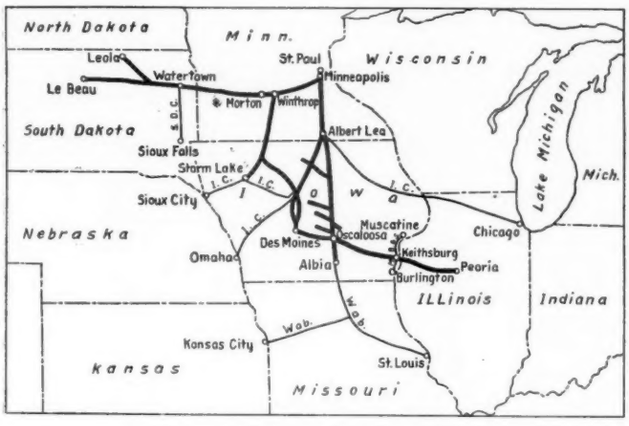
Atlantic Coast Line Passenger Coach Built at Harlan Plant of the Bethlehem Shipbuilding Corporation

The Trouble with the Minneapolis & St. Louis

Costs Have Gone Up 100 Per Cent in Seven Years While Gross Earnings Increased Only 50 Per Cent

By F. J. Lisman

THE MINNEAPOLIS & ST. LOUIS is a system owning 1,650 miles of road in the states of Iowa, Minnesota and South Dakoa. The oldest part of this system is the Des Moines & Fort Dodge Railway, which was commenced in the 1860's, under the title of the Des Moines Valley Railway. The conception of the Des Moines valley is a rather interesting indication of the viewpoint of those days. This road was to be constructed from Fort Dodge through Des Moines to Keokuk, Iowa, then the head of navigation of the Mississippi valley, whence the product of the Iowa farmer was to be shipped to the markets of the world by way of the Mississippi river and New Orleans. While Chicago was already a very important city, its dominant position in the western markets evidently was then not fully realized. Other divisions of the present Minneapolis & St. Louis were constructed by the same people who were at the same time building a road from the Twin



The Minneapolis & St. Louis

Cities to the head of the Lakes—that is, the St. Paul & Duluth, now part of the Northern Pacific. These people had in mind building a railway to St. Louis, then the largest western city.

With the growth of Chicago these schemes proved rather impracticable. It was gradually realized that traffic drained in that direction, and the Minneapolis & St. Louis which was completed for a distance of 110 miles from the Twin Cities to the Iowa state line—that is, to a connection with the Burlington, Cedar Rapids & Northern, which at that time worked closely with and is now part of the Chicago, Rock Island & Pacific System—was extended westerly from Minneapolis into the fertile farming lands of central Minnesota, instead of to the south.

Financial Difficulties

The road got into financial difficulties in the late 80's, largely as a consequence of the construction of this western extension. Under the able management of the receiver, W. H. Truesdale, since many years president of the Delaware, Lackawanna & Western, the property came out of its difficulties rather well in 1894 when its finances were readjusted. A few years thereafter, under the management of the late Edwin H. Hawley, the company started a series of extensions, which, while very useful in developing the adjacent farming lands, have never been particularly profitable to the company.

The extension from Morton, Minn., to Watertown, S. D., a distance of 125 miles, has probably been reasonably profitable, taking into consideration the business delivered to the main line, but the 150-mile extension from Winthrop, Minn., southerly to Storm Lake, Iowa, has been a great drag.

In 1901 the Minneapolis & St. Louis leased the Iowa Central, thereby increasing its system about 500 miles. The Iowa Central itself had a most interesting and checkered history. It was started in the 60's as a coal feeder to the then independent Dubuque & Sioux City Railroad, which shortly thereafter was absorbed by the Illinois Central. Not receiving satisfactory treatment from the Illinois Central the line was extended southerly to the Chicago & North Western. The promoters also had an idea of building a line from the Twin Cities to St. Louis. The title of the road at that time was St. Paul & St. Louis Ry. It went into receivership in 1873, was reorganized in 1879, went into bankruptcy again in 1884 and was again reorganized in 1889.

The company, which was then called the Central Railroad of Iowa, owned a bridge over the Mississippi river, opposite Keithburg, Ill., which was subject to a separate mortgage. In the late 80's the receiver defaulted in the payment of interest on this mortgage, whereupon the bondholders caused the draw of the bridge to be swung up and down stream and refused to reopen the bridge to traffic until the past due interest was paid and an agreement entered into to pay for the use of the bridge regularly thereafter. It was probably a matter of sixty days in which no trains crossed the bridge. During this time the railroad company as well as a small proportion of the public in the neighboring communities were put to inconvenience, but in the end the people who had invested their money in the bridge received justice and the investment of capital in bridges and railroad securities was not discouraged. Nowadays, someone would get an injunction compelling the bridge to be promptly opened to the railroad company and the public; consequently, the public would be put to no inconvenience whatever at the time. The public, however, suffers much more in the long run because capital, of course, will not run the risk of investing where it cannot obtain protection.

The Iowa Central, which in 1901 extended from a connection with the Minneapolis & St. Louis System in northern Iowa to Peoria, furnished a through connection for the Minneapolis & St. Louis with the eastern trunk lines at Peoria. This system was thereby enabled to more advantageously compete for through business to all points east and south because it was no longer dependent on its competitors for its eastern connections.

Ambitious Plans

About 1910 a new program of development was conceived. A merger instead of a lease of the Iowa Central was effectuated and a subsidiary company with the am-

bitious title of Minnesota, Dakota & Pacific was organized for the purpose of connecting the Minneapolis & St. Louis system with the Canadian Northern and Grand Trunk Pacific railways at the Canadian border, with the idea of furnishing a connection for these systems with the Twin Cities and the eastern trunk lines at Peoria in competition with the "Soo System," controlled by the Canadian Pacific, which reaches the Twin Cities and Chicago. A start in that direction was made in the construction of 250 miles of railway in South Dakota and the execution of a $75,000,000 refunding and extension mortgage, the proceeds of which were to be used from time to time to refund underlying liens and to build this ambitious extension. These 250 miles through South Dakota have been a drag on the property ever since and undoubtedly have greatly contributed to the present difficulties of the company.

The fundamental cause of the present difficulty, however, is the slight revenue for the service the company performs. Up to the increase in costs, brought about by the war, the Minneapolis & St. Louis struggled along and had a fair surplus, during good years paying up to 5 per cent dividends on an issue of preferred stock, which originally represented bonds. Roughly in the last seven years the company's gross earnings increased 50 per cent, while the actual cost of handling this traffic, that is, conducting transportation, has increased 100 per cent, and the cost of maintenance of way and equipment has increased somewhat over 100 per cent.

Interest Requires 16 Per Cent of Gross

It takes about $2,100,000, or about 16 per cent of the $13,500,000 of the company's gross earnings, to pay the interest on the funded debt outstanding in the hands of the public. During the calendar year 1922 the company earned not quite half of this amount. In other words, out of every dollar of gross earnings there was left only about 6½ per cent applicable to interest on the investment.

The senators of the various states adjacent to this railroad want railroad rates reduced 25 per cent. If this is done, the Minneapolis & St. Louis would fail by approximately 18 per cent of its gross to earn operating expenses and taxes. It would be interesting to know who is to furnish this money, amounting to about $2,700,000 annually.

Thus far, no figures on the valuation of the Minneapolis & St. Louis by the Interstate Commerce Commission have been published, but considering the fact that the company owns very valuable terminals at Minneapolis, Des Moines and elsewhere, and about 225 locomotives and 8,600 freight cars, the valuation is not likely to be less than $60,000,000, which would be par for all the bonds and floating debt and about 25-30 for the stock. At present market prices for the securities, the property has a value in the market of about $15,000,000.

Future Status

Professor Ripley's plan of consolidation puts the Minneapolis & St. Louis System into the Chicago, Burlington & Quincy-Northern Pacific System, on the theory that the road shall connect with some Northern Pacific branches in South Dakota, and that a through line could be developed between the Chicago, Burlington & Quincy and Northern Pacific which would avoid the congestion at the Twin Cities. The C., B. & Q. is also weak in northern Iowa, but more or less parallels the 200 miles of the system between Oscaloosa, Iowa, and Peoria, Ill. Professor Ripley suggests that the southern lines of the Minneapolis & St. Louis would fit advantageously into the Chicago, Milwaukee & St. Paul. The road might also be used to very good advantage by the Illinois Central, giving that road an excellent line into the Twin Cities and through connections between its Iowa and Illinois lines via Peoria.

The reorganization of the Minneapolis & St. Louis is not likely to be brought about quickly for the following reasons:

1. In order to induce stockholders, or anyone else, to furnish the new money necessary to rehabilitate the road and its finances, better earnings must be obtained.

2. There is due the United States government $1,382,000, secured by $2,377,000 of the company's refunding and extension bonds, selling in the market for about 16. In other words, the collateral for the government loan at present market prices is worth only about 30 per cent of the claim. It will, therefore, probably take time to negotiate a satisfactory settlement with the government.

3. On December 31 the company had a total floating debt of about $9,300,000, with so-called marketable assets of $3,920,000, which includes the always questionable account "due by individuals and companies" $1,293,000. Omitting this item, the net floating debt of the company was over $6,500,000, and it has presumably increased somewhat since then.

4. A substantial proportion of these liabilities in the shape of audited vouchers surely have precedence of the mortgages. The company's bills payable are no doubt to a considerable extent secured by the same junior bonds as are held by the government for collateral for its claim. It will probably take a long time to litigate or compromise the status of much of this indebtedness.

Increase in Land Values

The status of this property, running as it does through these three agricultural states, reminds the writer of a conversation which he had several years ago with an old gentleman living in that part of the country. This gentleman started his career as a boy in the United States land office at Des Moines, when the government was supplying land at $1.50 per acre as fast as applicants wanted it. It was his lot to travel frequently overland by stage coach from Des Moines to Keokuk, then by steamer down the Mississippi river to St. Louis, in order to deposit funds. This same land, owing to the opening and development of the country by the railroads, is now selling at from $200 to $300 an acre. Iowa has become one of the richest states in the Union. In other words, while the price of land within the span of one life has increased on an average approximately one hundred-fold, the money invested in what is now the Minneapolis & St. Louis Railroad has for a large part of the period had no interest, and is now worth less than 25 per cent of the total amount raised and devoted to the development of the adjacent country and its transportation service.

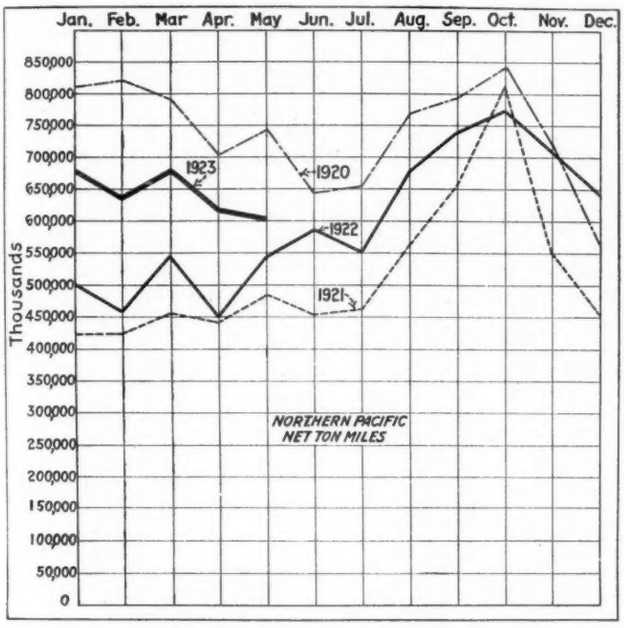
The worst of it is that this is really not an exceptional case, inasmuch as the so-called sucessful lines, like the Chicago & North Western and Chicago, Burlington & Quincy, etc., are at best not earning anything like a fair rate of interest on the low valuation of the properties which has been worked out by the Interstate Commerce Commission.

While our granger friends think it is perfectly proper for them to have an unearned increment on their lands, they do not concede this same right to the capitalist or corporation who developed this unearned increment for their benefit. They complain bitterly about the valuation of the railway companies' lands. Upon analysis, it is shown that the value of the lands in the various valuations thus far completed approximates from 12 per cent to 16 per cent of the value of the properties; that is, the value of the lands for the railroads as a whole, would probably not exceed three billion dollars. Radicals frequently talk about the Interstate Commerce Commission having marked up the lands of the railway companies by five to six billions, but the fact is that if no credit whatsoever is given for the value of the lands, the railways still would not be earning a fair rate of interest.

Northern Pacific Not Reporting Good Earnings

Suffers Like Other Northwestern Roads—Return on Investment in 1922 But 3.53 Per Cent

THE ESTABLISHMENT of a receivership for the Minneapolis & St. Louis will help direct attention to the rather serious condition which is confronting the roads in the northwestern section of the country. It is understood that the railways in that territory have given some consideration to the advisability of applying to the Interstate Commerce Commission for higher rates. That they need higher rates is painfully evident, but the radical sentiment that caused the election of men such as Magnus Johnson is localized in the central west and northwest. It is likely that requests for a higher rate level by the northwestern



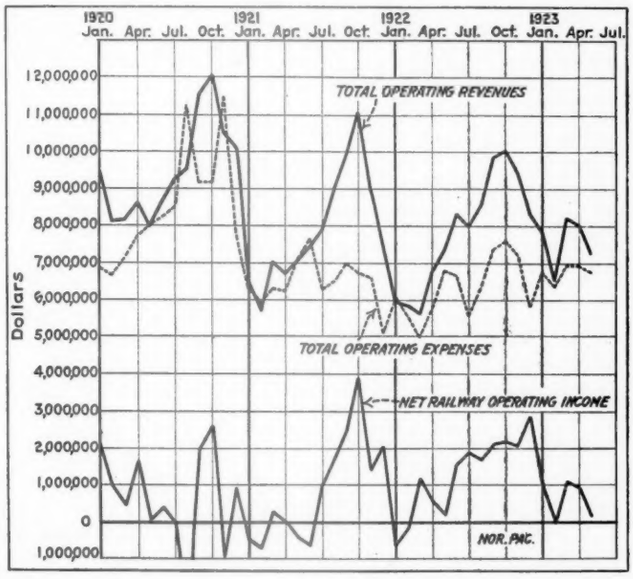
Northern Pacific Traffic Is Not Heavy at Present

carriers would meet the strongest kind of opposition from the political leaders in the states which the northwest carriers serve.

Much has been said in these columns of late about the misfortunes of the New England carriers. It has not been generally realized that the net earnings which the northwestern carriers have been reporting have been but slightly better than those which have been shown by the roads in the New England region. In the first five months of 1923, net operating income of the Class I railroads of the country was equivalent to an annual rate of 4.98 per cent on their property investment. Roads in the eastern district earned 5.99 per cent and those in the southern district, 5.75 per cent. The roads in the western district, however, earned at the rate of only 3.62 per cent. Of the three regions in the western district, the one that earned at the lowest rate was the northwestern region, and the net operating income of the roads in that region was but 1.96 per cent. This rate was slightly more than twice the rate of 0.88 per cent earned by the New England railroads, but nevertheless so far below the earnings of the other regions or districts, and so far below the average of 5.75 per cent on its tentative valuation which the Interstate Commerce Commission has determined to be adequate, as to indicate that like the New England lines, the northwestern roads need special treatment of some kind if they are to continue to serve their district properly.

The Northern Pacific is one of the northwestern roads. It is one of the better off roads of the northwestern group, excepting, of course, the two iron ore roads operated by the Steel Corporation, the Duluth & Iron Range and the Duluth, Missabe & Northern. Conditions, however, surrounding the Northern Pacific are not what they should be. Better off though it may be from the standpoint of net income than some of its neighbors, its situation is by no means satisfactory.

In 1922, the Northern Pacific's net after fixed charges was $15,056,929. The road now pays only 5 per cent dividends whereas it formerly paid 7 per cent. In 1922 its dividends totaled $12,400,000, leaving an income balance for the year of $2,656,929. In other words, the earnings of the road would not have been sufficient to restore the former 7 per cent dividend. In 1921 the road had a net after charges of $22,065,399; but it had, however, a lower operating net than in 1922. The fact that the 1921 net after charges was approximately $7,000,000 larger than in 1922 was due to the extra dividends paid by the Burlington, of which the North-



Northern Pacific Earnings are Subjected to Sharp Seasonal Variation

ern Pacific is one of the owners. After the payment of the 7 per cent dividends in 1921, the surplus balance was $4,705,399.

Net operating income in 1922 was the best reported since 1918, being a total of $19,450,515 as compared with $10,843,826 in 1921. On the other hand, the 1922 net operating income represented a return on the Northern Pacific's property investment of only 3.53 per cent. Its guaranteed standard return under government control was $30,000,000. Improvement though it was over any year as far back as 1918, its net operating income for 1922 was only two-thirds

of its average net for the three years ended June 30, 1917.

The Northern Pacific's net operating income for the past several years is given in the following table:

	Railway property investment including material and supplies	Net railway operating income	Return on investment per cent
Fiscal year ending:			
June 30, 1915.....	$491,035,831	$23,750,070	4.84
June 30, 1916.....	494,610,960	32,456,353	6.56
Calendar year ending:			
December 31, 1916....	498,225,699	33,446,012	6.71
December 31, 1917....	512,950,626	30,491,140	5.94
December 31, 1918....	526,323,059	24,217,342	4.60
December 31, 1919....	528,333,822	14,368,479	2.72
December 31, 1920....	540,259,557	7,949,458	1.47
December 31, 1921....	544,496,786	10,843,826	1.99
December 31, 1922....	550,332,639	19,450,515	3.53

The Northern Pacific thus far in 1923 is doing better than it did in the early part of 1922. Its net operating income in the first six months of 1923 was $3,921,643 compared with $2,718,239 in the first six months of 1922. Substantial as this increase is, however, the actual amount earned is less than the road needs.

The Northern Pacific's operations in 1922 were handicapped by a number of things, some of which still affect them. The road handled more traffic than in 1921. Its revenue tons showed an increase over 1921 of 21.4 per cent and its revenue tons one mile of 13.83 per cent. Its revenue tons, however, were much below those handled in 1920 and various previous years and with the exception of 1921, the 1922 revenue ton-miles were the lowest reported since the year ended June 30, 1915. The reduction in rates on agricultural products and live stock, effective January 1, 1922, had a severe effect on Northern Pacific's gross and net because of the large volume of this sort of traffic which it handles. The revenue per ton-mile in 1922 was 1.191 cents whereas in 1921, it was 1.309 cents, this being a reduction of 9 per cent. In consequence, while the Northern Pacific's revenue ton-miles in 1922 were 13.83 per cent greater than in 1921, its freight revenues were only 3.58 per cent greater.

CAR SHORTAGES

Date	Box	Total	Date	Box	Total
Sept. 1-8.....	0	0	Nov. 1-8.....	12,000	15,250
8-15.....	0	0	8-15.....	11,200	15,200
15-23.....	3,550	3,550	15-23.....	11,000	14,600
23-30.....	4,100	5,775	23-31.....	5,100	6,625
Oct. 1-8.....	4,950	7,670	Dec. 1-8.....	888	1,247
8-15.....	5,965	10,315	8-15.....	805	914
15-23.....	6,500	11,445	15-23.....	834	1,092
23-31.....	9,500	14,175	23-31.....	691	754

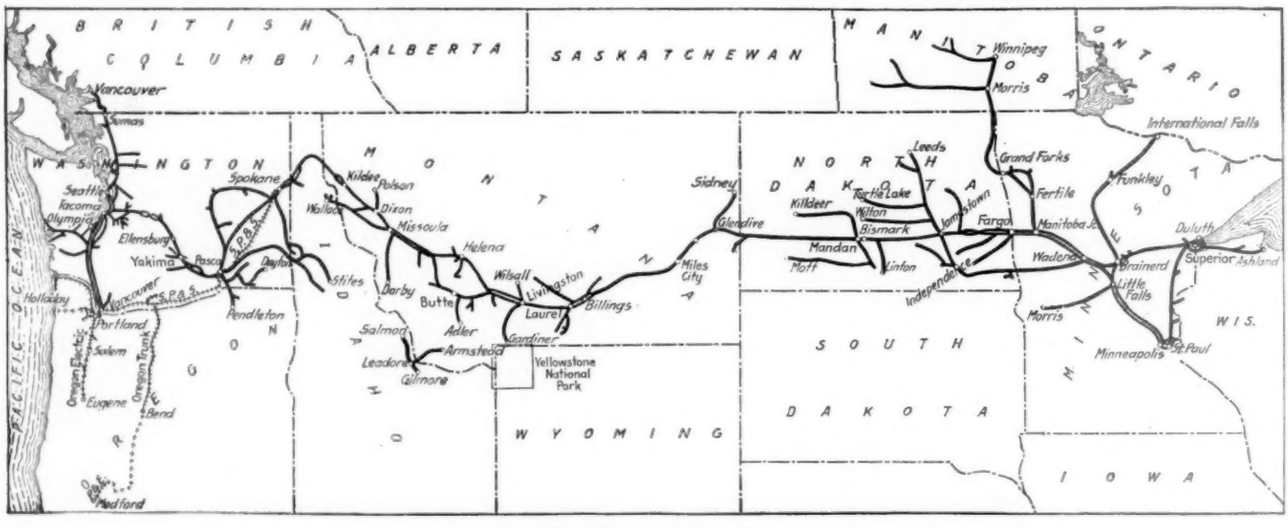
PER CENT OF CARS ON LINE TO OWNERSHIP

	1920		1921		1922		1923	
Month	N. P.	N. W. Dist.	N. P.	N. W. Dist.	N. P.	N. W. Dist.	N. P.	N. W. Dist.
Jan. 1...	....	....	94.4	99.9	98.6	98.1	75.4	91.0
Feb. 1...	....	....	96.4	101.7	93.0	99.9	76.6	95.1
Mar. 1..	....	....	92.1	99.9	90.2	100.6	74.3	98.7
Apr. 1...	....	....	90.5	99.3	88.4	101.4	72.9	100.2
May 1...	....	....	90.5	97.7	90.7	98.0	75.7	98.4
June 1...	....	....	92.3	98.7	88.8	100.5	86.1	98.5
July 1...	61.6	93.5	84.2	99.1	88.3	100.5	89.6	100.4
Aug. 1..	72.4	97.8	93.1	100.4	94.2	102.7	....	....
Sept. 1..	83.4	99.8	92.3	103.7	90.2	102.8	....	....
Oct. 1...	78.8	99.1	92.7	103.0	81.8	102.2	....	....
Nov. 1...	77.0	97.9	87.6	100.8	67.0*	92.6	....	....
Dec. 1...	86.7	101.9	97.5	100.0	70.2	89.3	....	....

* Box cars 54.7.

impossible to put the agreement for a settlement into effect on account of the opposition of the national leaders, the railroad had to fight the strike, which it did without serious interference with its operations. The striking employees finally called the strike off in February, 1923, but prior to that time the men who had filled their places had established a company organization of their own.

A feature that caused the Northern Pacific and the other transcontinental roads much worry has been the competition for traffic of ocean vessels using the Panama Canal. The transcontinental carriers have not been permitted to establish rates to the Pacific coast ports less than the rates to intermediate points, or as the annual report puts it, "the railroads are now in a position where it is impossible to meet ocean competition at terminal points like Seattle, Tacoma and



The Northern Pacific

The strike of the coal miners did not presumably affect the Northern Pacific in a very great degree. It handled considerably more coal than in 1921 which was a help, and it is not apparent that its fuel costs were increased unduly. The road had a peculiar situation with reference to the shop strike because the management and the men reached an agreement for a settlement shortly after the strike began, which agreement, however, the national leaders would not permit to be put into effect. The strike proved to be quite effective. Of the total of 8,648 men employed in the shops and roundhouses on June 30, 8,134 left the service. After it was found

Portland without making in the rates to intermediate points reductions involving losses out of all proportion to any possible gains in connection with business moving to the terminal points." The report adds that the westbound traffic to the Pacific coast terminal points is especially desirable because the preponderance of eastbound tonnage makes it possible to increase the westbound loaded car movement without any appreciable increase in operating costs.

Another feature that adversely affected the Northern Pacific's net in 1922 was the difficulties it had with car supply, particularly in the fall when the grain movement was on.

On November 1, 1922, the Northern Pacific had on its own lines but 13,654 box cars, equivalent to but 54.7 per cent of the road's box car ownership. The percentage of all cars on line to ownership on that date was 67 per cent. The result was that the road was confronted with a very severe shortage of equipment. In the period from November 1 to 8, the road reported an average shortage of box cars of no less than 12,000, and of all cars of no less than 15,250. The annual report draws attention to the fact that the shortage of box cars is not so serious in the case of a commodity like grain because the effect is merely to postpone the movement. It adds, however, that a relatively large part of the company's freight revenue comes from the transportation of lumber and other freight which must be handled when it is offered or the business is lost.

A statement of the fact that at its worst there was a car shortage of 15,250 cars would be enough to indicate the seriousness of the handicap with which the Northern Pacific was confronted during what would normally be its peak movement for the year. The situation was all the more serious because the Northern Pacific seems to be well supplied with equipment. It normally reports a substantial credit per diem balance. In 1921, however, its net credit for equipment rents was $1,445,606. In 1922, however, its net credit for equipment rents was $2,566,626. As a more or less rough average the monthly credit equipment rent balance would run from $100,000 to $150,000. In September, 1922, the net credit balance was $227,049, in October it was $363,-853, in November it rose to $474,660, and December was almost as bad with $380,869. This is one of those cases where a dollar a day per diem rate was not remunerative, because the Northern Pacific cars that were off its lines would unquestionably have been worth more than the dollar a day in its own service. The Northern Pacific has at present a substantial car surplus although it is not among those roads that are handling the heavy traffic. The optimists believe that the peak business of 1923, whenever it may occur, will be handled without a car shortage or at worst with only a small car shortage, in which case the Northern Pacific would benefit accordingly.

With further reference to the statement made above that the Northern Pacific has an ample car supply, at least from the standpoint of ownership, it should be added that during 1922 the road received a small number of new cars, and will receive during the present year, if they are not already on its rails, 4,750 additional cars.

The Northern Pacific freight revenues in 1922 were $71,-725,005, an increase over 1921 of $2,478,501 or as has been previously noted, 3.58 per cent. Passenger revenues of $15,-551,897 represented a decrease of $1,463,258 or 8.60 per cent as compared with 1921. Total operating revenues were $96,076,066 as compared with $94,538,059 in 1921, an increase of $1,538,007. Operating expenses totaled $72,654,-711 as compared with $77,630,867 in 1921, a decrease of $4,976,156. The small increase in gross, the larger decrease in expenses and the marked increase in per diem already mentioned explain the increase in net operating income from $10,843,826 in 1921 to $19,450,514 in 1922, the amount of the increase being $8,606,688. The 1922 operating ratio was 75.62 per cent compared with 82.12 per cent in 1921, and was the best ratio reported since 1918. That the Northern Pacific is not back to normal is indicated by the fact that in 1917 the road operated for 60.41 per cent, and in 1916, for 53.85 per cent.

The Northern Pacific's revenue tons in 1922 totaled 21,-451,028, previously noted as being 21.04 per cent in excess of the figure for 1921. The 1922 revenue ton miles totaled 6,121,158,972, already noted as being 13.83 per cent in excess of the 1921 figure.

The Northern Pacific tonnage is fairly diversified except that products of manufacturers do not bulk very large in its total. The most important single group of commodities is products of forests. The tonnage under this group in 1922 was heavy, totaling 7,635,806 tons or over one-third the total revenue tonnage. This compared with 5,525,854 tons in 1921, and it was in excess even of the shipments in 1920 which totaled 7,253,665. On products of forests the Northern Pacific gets a long haul and the traffic is understood to be rather lucrative. For some months the road has been loading more cars of forest products than it was loading at this time last year, the increase shown for some of the weeks in the car loadings figures approximately 25 per cent.

R. I. Installs Main Trackers

Following a 30-day study of the volume of traffic moving between more important points on the Rock Island System three months ago, it was evident that the movement of this traffic could be expedited by accumulating it into solid trains at certain points for movement intact to remote destinations and "main trackers" were installed on several routes on July 1.

In this investigation it was found that Silvis (Rock Island), Ill., forwards an average of 23 loads daily for El Reno, Okla., and Texas points, and 41 loads for Kansas City, while Kansas City forwards an average of 43 loads for El Reno and 41 for Texas points. Train No. 93 is now, therefore, made up at Silvis with freight moving through El Reno, filling out with loads for Kansas City proper where the latter cars are replaced with Texas business originating at Kansas City. In this movement this train holds the main track while passing through terminals at Elden and Trenton, Mo.; Topeka, Herington and Caldwell, Kan., and Waurika, Okla. By this measure the train is given full tonnage, while the time between Chicago and Fort Worth was reduced 12 hr. and 30 min., effecting fifth instead of sixth morning delivery.

In a similar manner, an analysis of the traffic moving to California points through El Paso showed that Silvis was forwarding an average of 38 loads daily for Hutchinson, Kan., and west, and Kansas City 97 loads for Herington and west. A train is, therefore, made up at Silvis for movement to Tucumcari, N. M., passing without break up through intermediate yards at Eldon and Trenton, Mo.; Topeka, Herington, Pratt and Liberal, Kan., and Dalhart, Tex., enabling the schedule to be reduced four hours. Similar main trackers have been established between Chicago and Kansas City, between Kansas City and Fort Worth and between Silvis and Colorado points.

Underwood & Underwood

Dressing Track by Motor Car on the Rock Island

Economic Aspect of the Fuel Oil Situation*

By C. E. Beecher

Petroleum Engineer, Bureau of Mines, Department of Interior

Today, the railroads of this country are among the greatest consumers of both coal and fuel oil. During 1922 they used approximately 96,000,000 tons of coal and 37,000,000 barrels of fuel oil. The purchasing and distributing of enormous amounts of fuel is a problem that confronts every large railroad. If the problem was merely to select the most efficient fuel for locomotive operation, fuel oil would out-rank coal, but the problem is not so simple, because many economic factors, such as price, assured source of supply, and distribution, have to be considered.

Advantages Derived From Use of Fuel Oil

Maintenance Advantages.

1. On the basis of theoretical heat units one ton of fuel oil is approximately equivalent to 1.46 tons of coal, but on the basis of actual operation, one ton of fuel oil is more nearly equal to 1.79 tons of coal.
2. Handling and switching charges at fueling points would be greatly reduced.
3. Necessity of maintaining separate bunkers for different kinds of coal would be eliminated because fuel oil is practically uniform in character, and all stock could be placed in same tank.
4. Smoke can be almost entirely eliminated. This is a most desirable feature for locomotives operating in districts where local ordinances require smoke elimination. Many railroads find it necessary to provide special grades of coal, often at great expense, for use in such districts.
5. Fuel oil does not deteriorate in storage. It is possible to store any desired quantity by providing sufficient tankage while it is impractical to store large quantities of coal because of the space required and because many coals deteriorate rapidly and some higher grade coals fire spontaneously.
6. An equal weight of oil can be stored in approximately two-thirds of the space required for coal, and an equal volume of oil has 50 per cent greater heating value than coal. Frequently oil can be stored in places which are practically useless for other purposes.
7. There are no ashes, clinker, or dirt to contend with when oil is burned, for it is completely combustible. The services of stokers and ash handlers are not required.
8. Oil can be handled cheaper and with less effort than coal. A simple pumping unit, pipe lines and tanks take the place of expensive and complicated conveyors, hoists and other elaborate devices commonly used for handling coal.
9. The cost of shovels, slice bars and other firing tools can be eliminated.
10. Maintenance charges for an oil-burning locomotive are approximately the same as for a coal burner, provided proper refractory materials are used in the fire box and the draft properly regulated.
11. The time required by the average coal burning locomotive to recoal and remove ashes at terminals and along the line will be saved. At terminals this means a saving of two to three enginehouse hours.
12. Overtime wages paid to engine and train crews can be reduced because the oil-burning locomotive can maintain a more uniform schedule.

Mechanical Advantages.

1. There is no loss of fuel because of the necessity to bank fires. Oil fires can be started almost instantly and the boiler temperature and pressure can be increased rapidly.
2. An oil fire is easily controlled and responds more readily to varying steam demands than a coal fire, because steam can be generated faster. It is possible to maintain a boiler pressure close to the maximum without the frequent opening of the safety valve which always results in a loss of steam and fuel.
3. Greater evaporative efficiency can be maintained because less material is deposited on the tubes and other heating surfaces.
4. With fuel oil there is no need of opening the firebox door as when firing coal, and opening the firedoor never fails to admit a rush of cold air to the sheets and flues.
5. A smaller per cent of excess air is required, resulting in higher temperatures and a smaller volume of waste gases.
6. A smaller combustion space is required, thus radiation losses are reduced.
7. Damage to the machinery and lubricating troubles caused by dust from coal and ashes will be eliminated.
8. The volume of fuel used can be accurately measured. This is of special importance for compiling data on the performance of engine crews and in making engine tests. The complicated machinery used for weighing coal is unnecessary. The amount of fuel on hand at any given time can be quickly determined.
9. Flue gas analysis shows that less fuel is lost through the stack.
10. Cinders, which are a constant source of annoyance and expense, are eliminated.
11. Longer locomotive runs can be made because much greater heat value in the form of oil can be carried in the same space provided for coal.

Safety Advantages.

1. Unlike coal, oil is not subject to spontaneous combustion. Fire hazard is the chief source of danger and this can be reduced to a minimum by properly constructed and vented tanks.
2. Danger to the employee in handling oil is less than with coal, thus eliminating many personal injury suits.
3. Fire hazard along the right-of-way is greatly reduced.
4. In an oil-burning locomotive the fireman can maintain his seat in the cab and thus be in a position at all times to observe operating signals. For fast trains this additional factor of safety is especially desirable.

The advantages in favor of fuel oil are so many that it might appear as though the railroads not using oil-burning locomotives were being inefficiently operated. Such a conclusion, however, would not be justified, for there is not sufficient fuel oil produced in this country to operate all the railroads for more than a few months out of each year If all the railroads now using coal were to substitute fuel oil, 406,000,000 barrels would be required annually, in addition to the 37,000,000 now being used, almost twice the amount of fuel oil produced last year. It is evident that fuel oil can not replace coal as a locomotive fuel, except to a relatively small extent and where conditions are most favorable.

Conclusion

Fuel oil possesses advantages over coal for railroad operation, but there are economic factors to be considered before deciding upon its use. The supply of oil is not unlimited and, at the present rate of production, we are rapidly exhausting our reserves without using the oil to best advantage. We are experiencing a period of over production, which tends to stimulate new markets and uses, but does not encourage conservation. There exists a world wide competition for oil and by over-developing our reserves, we are making it possible for foreign countries to obtain our oil at prices much less than elsewhere in the world. For example, the Japanese Navy is now purchasing quantities of California

*Abstract of a paper presented at the convention of the International Railway Fuel Association, Cleveland, Ohio, May 21-24, 1923.

fuel oil for an estimated price of $1.05 per barrel, while the price of fuel oil at Balik Papan, Borneo, is approximately $2.12 per barrel. Incidentally the California ports are now 2,500 miles farther from Yokohama than the oil ports of Borneo, and the Borneo fuel oil is a higher grade than that obtained in California. France, England and other European countries are short of oil and are only too willing to grasp every opportunity to purchase cheap fuel oil, as well as refined products, from this country.

The present period of overproduction is only temporary, but while it lasts new demands are being created which will be the first to feel the pressure of reduced production accompanied by increased price. An industry dependent upon fuel oil should be assured of a source of supply at a reasonable cost. For a railroad, where the demand is large, it is highly desirable to control sufficient oil production to meet its needs. Some railroads, either directly or indirectly, have found it most profitable to own and operate oil properties, and thus at all times be assured of a fuel supply.

With decreased production, the amount of fuel oil available for railroads and other industrial purposes will depend largely upon the demand for marine and naval purposes and for refined products. Since oil has such a marked advantage over coal for marine purposes, ship operators can afford to purchase it at prices which would prohibit its use by railroads. The supply of fuel oil will be reduced with the extended use of the cracking process of refining, which must be generally adopted if our future demands for gasoline are to be met. Thus the amount of fuel oil which in the future will be available for railroad use will be affected on one hand by a stronger demand, and on the other by a decreased production resulting from improved refining.

Approximately 45 per cent of the estimated oil reserves in the United States are the heavier oils containing a large percentage of fuel oil and are confined to California, the Gulf Coast states, and the Rocky Mountain area. With the exception of the latter, these are the areas in which fuel oil is now being used by the railroads. Considering both the estimated reserves and present rate of production, fuel oil can not be produced in sufficient quantities to enter into strong competition with coal as a railway fuel. In California competition with coal does not exist but in the southern states it does, and as a result some systems burn oil, some coal and others both, while the reserves in the Rocky Mountain area have not been developed to a point where oil has entered into competition.

We are at present reveling in a period of overproduction and a period in which our oil reserves are being rapidly exhausted without apparently giving much thought to the future. The present rate of development is hastening the time when the peak of our production will be reached; just when this will occur, no one can say. Therefore, any railroad deciding to use fuel oil for locomotive operation should be assured of an adequate future supply at a cost which will justify the change over to oil fuel and back to coal.

P. R. R. Combination Car

THE NEW all-steel combination cars for the Pennsylvania, Class PB-70, built at the Harlan plant of the Bethlehem Shipbuilding Corporation, Wilmington, Del., have a passenger compartment 34 ft. 9⅝ in. long, with seats for 44 persons and a baggage compartment 35 ft. 6 in. long. The length of the body is 77 ft. 8¾ in. The weight of

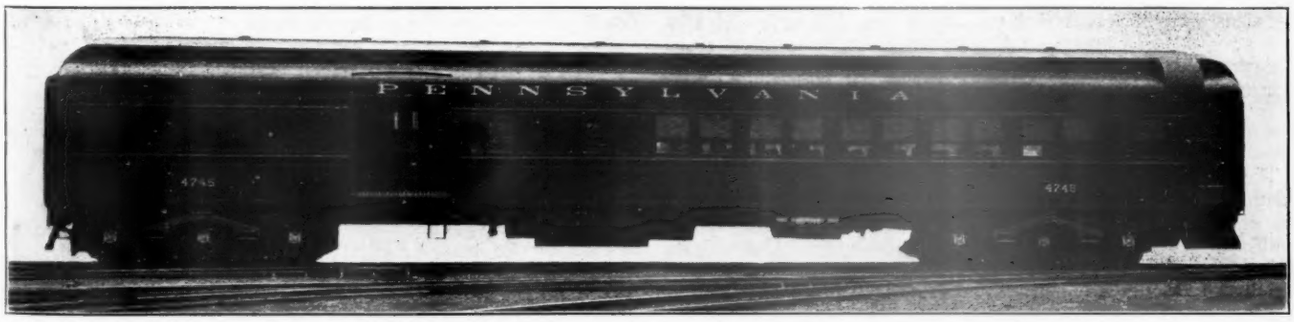
Interior of Pennsylvania Combination Passenger and Baggage Car

the car is 134,600 lb., of which the two trucks constitute 45,900 lb. These trucks, which are of the Pennsylvania patented six-wheel type, Class 1-D, have 36 in. steel wheels, 5½ in. by 11 in. journals and a wheelbase of 11 ft. 0 in.

The interior finish, including the ceiling, is in steel with Ceilinite on the back. The flooring is of Flexolith composition. The seats are Hale & Kilburn No. 194. Parcel racks of the continuous type are provided. Window fixtures and trap doors are of O. M. Edward's design.

The Gold Car Heating & Lighting system of steam heat is used in the passenger end and the Vapor Car Heating & Lighting system in the baggage end. The lighting equipment was furnished by the United States Light & Heat Corporation, the batteries being of the Edison type.

The couplers are type D, with Westinghouse type N-11 friction draft gear. Fowler upper buffer springs also are applied. The brake equipment is of the U C type, with 16-in. cylinders. The foundation brake rigging is of the clasp-brake type of the Pennsylvania design.



Pennsylvania Combination Passenger and Baggage Car Built at Harlan Plant of the Bethlehem Shipbuilding Corporation

General News Department

The third annual athletic meet of the Northwestern region of the Pennsylvania will be held at Grand Rapids, Mich., on September 1. Prizes consisting of 250 gold, silver and bronze medals will be awarded the winners of track and field events, in golf, rifles, trap shooting, tennis and baseball. The winners of the regional meet will represent the Northwestern region at the system meet at Altoona, Pa., on September 22.

The rules governing the location and operation of loading racks for gasoline, etc., as agreed upon by the American Railway Association in conference with petroleum shippers, and as issued in December, 1920, have been revised; and J. E. Fairbanks, general secretary of the A. R. A., has issued Circular No. 2084-A, dated July 30, 1923, embodying the changes which have been made.

A "golden rail" is to be set into a section of the track of the Union Pacific at Cedar City, Utah, as a memorial in honor of President Harding, who presided at the official opening of the road to that point on June 27 last. The rail will bear the inscription "The Harding Memorial Rail, Laid by the Citizens of Iron County, Utah, to Commemorate the opening by President Harding of the Union Pacific National Park line to Cedar City, on June 27, 1923." The dedication will take place on Sept. 12.

C. & E. I. Collects Damages for Crossing Accident

The administrator of the estate of a man who was killed in a grade crossing smash-up at Danville, Ill., in 1916 has paid the Chicago & Eastern Illinois $5,000 in settlement of its claim for damages to one of its locomotives and to its tracks resulting from the accident. In the collision, the driver of the motor car and the engineman of the locomotive were killed, and the engine was derailed, causing considerable damage to the track.

Train Robbery on M.-K.-T.

Five masked robbers stopped southbound passenger train No. 123 of the Missouri-Kansas-Texas near Okesa, Okla., on the night of August 20 and got away with 20 packages of valuable mail. It is believed that the band boarded the train at Bartlesville. The engine, the tender, and the mail cars were cut off and the engineman was forced to move them forward about a quarter of a mile. The robbery was accomplished in twenty minutes without serious injury to train crew or passengers.

N. Y. C. Buys Pier Lease at Weehawken, N. J.

The New York Central has purchased from the Cunard Steamship Company its lease on Pier K-44, Weehawken, N. J. This pier adjoins the New York Central's West Shore terminal. The pier is the property of the railroad but was leased to the Cunard Line 10 years ago, which company intended to improve it but its plans were never carried out. The New York Central also has acquired from the Cunard Company the lease on the old Delaware & Hudson coal pier at the foot of Baldwin avenue, Weehawken.

The Alaska Railroad

The designation of the "Alaskan Engineering Commission," the organization which built the government railroad in Alaska and has charge of its operation, has been changed to "The Alaska Railroad," it was announced this week by the Interior Department. The adoption of this name will eliminate the confusion of this activity of the Interior Department with what is known as the Alaska Road Commission, which is under the supervision of the Secretary of War and charged with the construction and maintenance of wagon roads in Alaska.

Indianapolis Studying Transportation Needs

J. Rowland Bibbins has been retained by the City Planning Commission of Indianapolis to advise its Transportation Committee on the general transportation plan of Indianapolis for both present and future. Mr. L. W. Bruck, of the Insley Manufacturing Company, Indianapolis, is chairman of this committee.

A preliminary survey will be made at once for the purpose of directing the further work of the commission in developing the transportation features of the city plan. This work will include the study of the needs and the future development of transit, traffic, thoroughfares, railroads, terminals, motor transport and the special needs of the various commercial, industrial and residential districts with the object of obtaining a well rounded out transportation plan best adapted to the needs of all the conflicting interests and for the guidance of the community in its future development.

Mr. Bibbins has previously studied the various phases of the transportation problem in 20 cities of the United States and Canada and is now developing plans for traffic improvement in Detroit and Montreal.

Condition of Equipment

Fifty-nine per cent of the locomotives inspected by the Bureau of Locomotive Inspection of the Interstate Commerce Commission during the month of July were found defective, according to the monthly report of the commission to the President on the condition of railroad equipment. The number inspected was 5,197, of which 3,077 were reported as defective; and 568 were ordered out of service. The percentage found defective compares with 61½ per cent during the first six months of 1923 and 68½ per cent during the last six months of 1922. The number of accidents occurring in July and caused by the failure of some part or appurtenance of locomotive or tender, as reported by the carriers, was 115.

The Bureau of Safety reports that it inspected 97,412 freight cars during July, of which 5.2 per cent were found defective and 1,994 passenger cars, of which 1.2 per cent were found defective. For July, 1922, the corresponding percentages were 7.8 and 1.3. During the month of July 109 violations of the safety appliance act were reported to various United States attorneys for prosecution.

Preparedness for a Coal Strike

In order to discuss and formulate plans for the distribution of bituminous coal and coke for domestic use into the principal anthracite consuming states, in the event of a stoppage of work at the anthracite mines on September 1, the governors of the states interested will be requested to send representatives to attend a conference at New York City on August 28, 1923, it was announced on August 22 by Fuel Distributor F. R. Wadleigh. It is hoped that every state will be represented, so that full discussion may be had and definite action taken in order to ensure the distribution into the respective states of sufficient amounts of coal and coke, to the end that the public may suffer no inconvenience, owing to a lack of fuel for heating its homes, offices, etc.

Representatives of the railways interested will probably be asked to attend the conference, and a representative of the Interstate Commerce Commission will be present, as the whole matter of fuel distribution is largely one of adequate transportation.

An important subject to be discussed will be the matter of education of the consumer in the use of fuels other than anthracite, as it is felt that a systematic plan of public instruction can be made of great service in the practical and efficient use of such fuels and will thereby reduce the actual cost of heating, with resultant savings to the individual consumer and the community.

The conference was announced following a conference with the President participated in by the federal fuel distributor and C. B. Aitchison, acting chairman of the Interstate Commerce Commission.

Wage Statistics for May

The Interstate Commerce Commission's summary of monthly reports of employees, service and compensation filed by Class I railroads for the month of May, 1923, shows that the number of employees and the amount of compensation were greater than for any month since the revision of the classification, July 1, 1921. The number of employees reported for May, 1923, shows an increase of 267,991 or 16.5 per cent over the number reported for the same month last year, and an increase of 52,567, or 2.9 per cent over the number reported for April, 1923 (as given in the *Railway Age* for July 7, page 39). The total compensation for May, 1923, was 19.8 per cent greater than in May, 1922, and 5.6 per cent greater than in April, 1923. Compared with the same month last year the average straight time hourly earnings for all employees reported on an hourly basis decreased from 58 to 56 cents, and overtime hourly earnings decreased from 77 to 75 cents. But owing to more regular employment the employees as a whole averaged 222 hours in May, 1923, as against 210 hours in May, 1922, which resulted in an increase in the average monthly earnings from $128 to $132.

The following table shows a comparison of the straight time hourly earnings of hourly workers by groups as reported for May, 1923 and 1922, together with approximate reduction in pay roll expense for May, 1923, as a result of the changes in rates as reported. It should be remembered that the average hourly earnings by groups are influenced to some extent by the proportions of skilled and unskilled labor within the group. The net saving shown has been to some extent offset by increases granted since May, 1923.

Group	Straight time hourly earnings, May 1923 Cents	Straight time hourly earnings, May 1922 Cents	Straight time hours, May, 1923	Reduction, payroll expense
Professional, clerical, etc.....	55.7	57.5	47,865,911	$861,586
Maintenance of way and structures	41.6	43.0	84,242,669	1,179,397
Maintenance of equipment and stores	57.1	61.5	119,078,087	5,239,436
Transportation (misc.).....	52.8	53.7	41,335,343	372,018
Transportation (yardmasters, etc.).	60.8	60.6	4,500,626	*9,001
Transportation (train and engine service)	73.5	73.8	67,799,872	203,400
				$7,846,836

*Increase.

The monthly earnings, by groups, were as follows:

Group	Monthly earnings of— Employees reported on daily basis May, 1923	May, 1922	Employees reported on hourly basis May, 1923	May, 1922
Executives, officials and assistants.	$426	$420	...	...
Professional, clerical and general..	179	178	$123	$124
Maintenance of way and structures.	239	237	92	90
Maintenance of equipment and stores	242	243	130	128
Transportation (misc.)	97	100	123	123
Transportation (yardmasters, etc.).	254	255	150	145
Transportation (train and engine service)	...	...	193	180

Treatment of Salvage, Piece Work and Prices in Settlements of Six Months' Guaranty

The Interstate Commerce Commission has issued a report in connection with the settlement with the Toledo & Ohio Central as to the amount of its guaranty for the six months' period following the termination of federal control, in which it decides that in the determination of proper general or composite factors to be applied to test-period charges in fixing the amounts which shall not be exceeded in charges to operating expenses for maintenance in the guaranty period, under the provisions of section 209 of the transportation act, the use of separate factors for new and scrap materials and the recognition of changes in the proportion of piece work represented in wages paid is, under existing circumstances, impracticable; and is not necessary to substantial justice. The commission also decided that in determining the difference in cost of material during the guaranty period as compared with the test period, the actual cost of material applied, as shown by the accounts (kept in accordance with its classifications) should be used.

Questions as to these points arose in connection with the settlement with the Toledo & Ohio Central and after various conferences with representatives of that company a hearing was held on January 30 and another on March 2, at which evidence was presented also on behalf of the Boston & Maine, the Pennsylvania, the Atchison, Topeka & Santa Fe, and the Lehigh Valley, at their request.

Master Blacksmiths Meet at Chicago

After two years without a convention the International Railroad Master Blacksmiths' Association held its twenty-seventh annual convention at the Hotel Sherman, Chicago, August 21, 22 and 23. Long periods of inactivity in association work are usually followed by more or less of a lapse of interest and the officers were pleasantly surprised, therefore, both at the attendance and the spirit shown. About 100 members of the association and 65 members of the Ladies' Auxiliary were present at the opening session. The keynote of the convention was undoubtedly the desire of the members to build up the association and spread knowledge regarding the best railroad blacksmith shop practice to the mutual advantage of all.

Following the usual opening exercises Joseph Grine (N. Y. C.), president of the association, delivered his address, emphasizing the main object of the association which is to enable members to help solve each others' problems. He pointed out that while the blacksmith shop supervisory forces were pressed to the limit during the war their work is hardly less arduous now in building up depleted shop forces and meeting new problems. He made an urgent appeal for the young men to take part in the discussion, tell about efficient shop kinks and shoulder their share of the responsibility.

M. J. Franey, formerly superintendent of motive power of the Chicago, Burlington and Quincy, followed Mr. Grine and paid a glowing tribute to the master craftsmen not only in the blacksmith but in other allied trades who have served their apprenticeships and risen from the ranks to positions of authority. Mr. Franey testified to the practical value of association work and praised as broad gage the higher officials who authorize their representatives to attend conventions.

Interesting and in some cases extremely valuable discussion followed the presentation of ten committee reports. The subjects covered and the names of the committee chairmen are as follows: Drop Forging, J. C. Boyle (Anderson Drop Forge); Frame Making and Repairing, G. W. Kelly (C. R. R. of N. J.); Tools and Formers, H. W. Langbridge (P. & L. E.); Spring Making and Repairing, C. H. Nutter (B. & M.); Heat Treatment of Steel and Iron, W. D. Savage (M., K. & T.); Reclamation, L. C. H. Weidman (C. C. C. & St. L.); Autogenous Welding, W. F. Keller (M. C.); Drawbars and Drawbar Pins, Wm. Nicholson (C. P.); Carbon and High Speed Steel, Paul Cain (M. C.); Powdered Coal, M. F. Maloney (American Locomotive Company).

Exhibitors

Approximately 50 representatives of railway supply companies registered at the convention, the following companies having exhibits:

Air Reduction Sales Company, New York.—Oxygen and acetylene tanks, hand and automatic welding and cutting equipment. Represented by G. Van Alstyne, G. E. Phelps, R. F. Helmkamp, E. M. Sexton, B. N. Law, R. O. Mueller and R. Peabody.

Ajax Manufacturing Company, Cleveland, Ohio.—Model of four-inch new model twin gear upsetting forging machine; upset railway forgings. Represented by J. R. Blakeslee, J. A. Murray, A. L. Guilford, R. W. Bannerman, W. W. Criley and C. W. Wicks.

Anti Borax Compound Co., Ft. Wayne, Ind.—Welding flux for cast iron and brazing flux. Represented by Charles O. Klane.

Bell & Gossett Company.—Case hardening compound. Represented by E. J. Gossett.

Buffalo Forge Company, Buffalo, N. Y.—Steel plate pressure blower with direct-connected motor drive. Represented by W. J. McDowell.

Garlock Packing Company, Palmyra, N. Y.—Garlock packings, gasket material and pump valves. Represented by John L. Fisher and C. W. Sullivan.

Jackman & Co., E. S., Chicago.—Literature on Firth-Sterling tool and die steels. Represented by E. T. Jackman.

Metal & Thermit Company, New York.—Represented by H. S. Main and W. H. Moore.

National Machinery Company, Tiffin, Ohio.—Forging machine and bolt machine products. Represented by E. R. Frost, F. W. Klenk, C. D. Harmon, F. J. Mawby and K. L. Ernst.

Railway Journal, Chicago.—Represented by E. C. Cook.

Railway Mechanical Engineer, New York.—Represented by C. B. Peck and E. L. Woodward.

Operating Statistics of Large Steam Roads—Selected Items for the Month of June, 1923,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross, Excluding locomotive and tender	Ton-miles (thousands): Net, Revenue and non-revenue	Average number of locomotives on line daily: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany	1923	394	313,723	333,998	32,854	5,862	64.6	321,709	130,056	117	25	17.7	...
	1922	394	229,134	245,001	24,951	4,897	69.0	235,136	83,705	113	29	20.6	...
Boston & Maine	1923	2,455	646,250	720,201	67,922	13,913	69.2	740,397	315,178	343	137	28.5	...
	1922	2,455	487,160	543,358	44,164	11,484	73.4	536,459	208,655	323	122	27.5	47
N. Y., New H. & Hartford	1923	1,974	561,552	604,600	38,109	13,288	68.1	706,597	304,218	304	88	22.5	1
	1922	1,977	430,932	471,156	28,811	11,623	71.7	536,951	206,110	284	73	20.4	39
Great Lakes Region:												
Delaware & Hudson	1923	886	417,914	583,390	54,450	11,186	66.2	740,166	388,385	239	56	19.0	9
	1922	887	232,880	313,571	30,428	6,500	69.0	358,335	160,964	287	29	9.3	178
Del., Lack. & Western	1923	993	543,098	659,476	102,536	16,929	68.0	948,724	439,738	289	66	18.6	4
	1922	994	432,729	520,779	88,251	13,738	70.7	672,889	269,911	305	56	15.6	67
Erie (inc. Chic. & Erie)	1923	2,309	987,435	1,125,752	65,219	35,703	69.8	2,092,933	989,676	661	145	18.0	114
	1922	2,309	776,142	855,677	57,602	25,813	64.9	1,445,047	602,624	534	227	29.8	98
Lehigh Valley	1923	1,317	609,724	674,219	74,032	18,079	71.4	1,059,318	537,249	353	191	35.1	15
	1922	1,316	485,582	543,571	81,178	14,677	67.8	803,161	352,103	460	102	18.2	201
Michigan Central	1923	1,827	567,978	575,208	22,561	18,594	66.0	996,284	397,824	313	85	21.3	29
	1922	1,827	491,998	501,469	19,060	16,251	66.9	833,704	321,978	315	89	22.1	91
New York Central	1923	6,469	2,348,415	2,687,965	198,614	83,875	62.8	5,150,247	2,360,655	1,289	448	25.8	211
	1922	6,468	1,623,513	1,793,943	101,195	60,167	68.0	3,183,189	1,287,273	1,144	569	33.2	419
New York, Chic. & St. L.	1923	1,225	496,879	503,099	3,278	14,788	67.7	777,342	314,643	148	71	32.5	7
	1922	1,225	473,801	477,420	1,587	14,003	68.8	696,649	273,338	173	69	28.5	42
Pere Marquette	1923	2,190	387,547	397,593	8,824	9,797	68.6	558,972	255,699	169	45	20.9	4
	1922	2,182	306,848	316,112	5,718	7,884	68.5	414,459	181,264	172	38	18.2	20
Pitts. & Lake Erie	1923	231	183,972	192,604	1,122	6,825	65.6	504,377	303,126	72	18	19.9	1
	1922	228	87,331	90,090	597	2,669	66.8	172,918	97,474	64	20	23.6	19
Wabash	1923	2,418	601,105	630,936	7,606	17,888	70.7	942,340	391,219	249	88	26.1	...
	1922	2,418	564,580	596,425	4,875	16,562	72.2	824,103	340,888	281	59	17.4	41
Ohio-Ind.-Allegheny Region:												
Baltimore & Ohio	1923	5,212	2,213,031	2,544,951	156,738	58,663	63.8	3,786,323	1,918,838	1,121	182	14.0	17
	1922	5,235	1,687,025	1,944,047	153,234	44,069	67.0	2,607,250	1,283,087	957	353	26.7	175
Central of New Jersey	1923	695	290,720	316,708	36,147	7,139	63.6	456,209	226,627	202	67	25.0	...
	1922	692	227,506	250,417	32,153	4,822	66.9	266,756	119,712	230	29	11.3	58
Chicago & Eastern Illinois	1923	945	226,466	230,103	3,836	5,801	65.5	331,051	157,553	122	55	31.0	27
	1922	945	228,409	238,285	2,624	5,636	62.2	313,251	140,317	123	38	23.8	40
Cleve., Cin., Chic. & St. L.	1923	2,377	684,469	722,453	9,196	21,723	63.5	1,349,140	643,552	336	102	23.3	35
	1922	2,383	676,322	725,639	11,845	21,063	62.7	1,279,072	595,158	295	151	33.9	6
Elgin, Joliet & Eastern[1]	1923	460	140,920	153,618	6,012	4,117	65.5	322,113	175,141	83	18	18.0	1
	1922	459	93,321	104,366	5,970	2,865	67.0	202,699	107,451	87	20	18.4	21
Long Island	1923	393	46,083	55,613	9,054	571	57.9	34,640	13,575	37	15	29.1	...
	1922	394	40,981	43,837	8,056	464	58.4	26,425	9,066	36	8	18.6	1
Pennsylvania System	1923	10,884	5,222,987	5,732,954	445,353	138,780	63.9	9,425,950	4,750,482	2,686	656	19.6	9
	1922	10,902	4,025,405	4,282,811	269,764	103,085	66.2	6,498,957	2,987,661	2,644	765	22.4	726
Philadelphia & Reading	1923	1,118	685,422	764,008	84,833	17,228	66.2	1,157,953	622,985	363	96	21.0	52
	1922	1,119	463,687	500,995	50,130	10,746	65.7	663,639	328,025	395	73	15.7	232
Pocahontas Region:												
Chesapeake & Ohio	1923	2,553	856,899	935,476	20,291	28,153	61.0	2,044,240	1,141,634	443	74	14.3	15
	1922	2,548	814,100	884,582	20,359	26,092	59.1	2,024,131	1,113,960	445	98	18.1	43
Norfolk & Western	1923	2,227	866,360	1,090,930	38,303	25,056	60.6	1,968,654	1,062,847	541	163	23.1	50
	1922	2,228	1,022,663	1,271,000	54,841	29,107	57.1	2,376,028	1,289,796	620	92	13.0	134
Southern Region:												
Atlantic Coast Line	1923	4,866	755,669	760,636	11,967	18,207	65.8	957,481	394,471	320	97	23.2	11
	1922	4,922	673,495	679,429	10,090	16,013	63.9	806,057	296,544	324	86	20.9	21
Central of Georgia	1923	1,907	305,089	307,381	5,281	6,057	71.3	324,986	147,473	115	18	13.3	...
	1922	1,899	250,145	256,142	4,742	5,399	70.0	267,094	104,275	115	15	11.5	...
I. C. (inc. Y. & M. V.)	1923	6,190	1,998,319	2,009,552	40,382	54,662	64.4	3,364,670	1,493,287	723	117	13.9	3
	1922	6,137	1,823,678	1,838,821	45,259	48,479	60.5	3,019,202	1,250,681	732	101	12.1	17
Louisville & Nashville	1923	5,032	1,703,165	1,821,780	61,291	30,373	61.0	1,972,460	933,403	599	110	15.5	...
	1922	5,021	1,819,805	2,052,159	78,332	33,428	61.9	2,161,312	1,027,331	602	79	11.6	...
Seaboard Air Line	1923	3,553	451,993	459,862	10,985	10,413	69.0	539,049	220,843	201	53	20.9	2
	1922	3,537	445,951	452,365	8,126	9,810	64.7	511,087	197,869	207	67	24.6	2
Southern Ry.	1923	6,942	1,554,033	1,596,594	35,394	33,423	66.1	1,833,539	789,715	789	135	14.6	...
	1922	6,942	1,340,100	1,365,679	29,472	29,511	66.1	1,531,302	610,665	897	146	14.0	23
Northwestern Region:												
Chic. & N. Wn	1923	8,463	1,581,966	1,647,229	22,609	35,990	63.8	2,078,802	941,545	901	203	18.4	36
	1922	8,419	1,343,493	1,373,840	18,024	30,007	65.5	1,597,585	656,571	811	232	22.3	95
Chic., Milw. & St. P	1923	11,007	1,693,221	1,740,577	68,457	42,819	64.0	2,426,044	1,072,434	867	185	17.6	39
	1922	11,027	1,456,685	1,497,847	64,668	38,267	66.5	2,045,125	891,747	831	232	21.9	121
Chic., St. P., M. & O.	1923	1,726	300,296	326,093	13,743	5,981	69.1	310,136	127,377	160	45	21.8	11
	1922	1,726	314,535	339,995	14,128	6,013	70.4	318,348	139,621	162	51	24.0	32
Great Northern	1923	8,256	860,451	889,548	40,753	27,307	63.1	1,692,145	848,236	541	198	26.8	65
	1922	8,263	837,947	873,805	42,666	25,690	63.1	1,557,853	754,787	589	141	19.3	122
M., St. P. & S. Ste. M.	1923	4,374	532,115	539,891	8,352	12,359	70.0	646,996	303,370	289	54	15.8	3
	1922	4,355	472,079	495,824	8,816	11,421	72.5	573,806	266,763	298	53	15.2	18
Northern Pacific	1923	6,422	827,218	870,359	57,326	23,351	65.2	1,368,110	612,455	535	147	21.6	30
	1922	6,389	790,103	827,515	50,853	23,679	66.8	1,307,838	587,813	539	140	20.6	97
Oreg.-Wash. R. R. & N. Co.	1923	2,186	205,883	217,739	21,114	4,976	65.6	284,812	127,804	127	50	28.4	14
	1922	2,186	197,316	218,185	28,982	4,671	72.3	251,401	112,951	123	33	21.3	1
Central Western Region:												
Atch., Top. & S. Fe	1923	9,870	1,585,868	1,677,359	84,329	41,629	64.3	2,370,797	873,809	717	174	19.5	62
	1922	9,798	1,398,865	1,465,336	66,750	38,136	66.7	2,130,191	831,387	748	155	17.1	171
Chicago & Alton	1923	1,010	306,375	311,922	4,257	7,458	64.5	444,703	205,448	119	36	23.4	10
	1922	1,010	270,646	274,269	6,594	6,246	66.0	338,542	132,125	106	45	29.8	27
Chic., Burl. & Quincy	1923	9,338	1,554,507	1,612,304	71,637	41,702	61.6	2,480,391	1,118,188	763	210	21.6	23
	1922	9,326	1,329,829	1,389,234	69,420	34,945	65.6	1,902,532	819,983	762	213	21.9	123
Chic., Rock I. & Pacific	1923	7,635	1,502,893	1,530,361	17,142	33,210	66.2	1,780,845	695,777	539	252	31.9	13
	1922	7,662	1,386,132	1,408,195	15,052	31,577	67.0	1,666,856	665,881	623	125	16.7	64
Denver & R. G. Wn	1923	2,593	233,719	296,556	58,963	5,146	71.7	292,452	148,002	269	118	36.0	1
	1922	2,593	213,014	258,804	48,660	4,915	70.4	280,608	138,105	237	70	22.8	35
Oregon Short Line	1923	2,367	325,355	340,693	23,653	7,696	65.4	462,061	212,428	166	64	27.7	24
	1922	2,360	299,846	317,412	25,995	6,890	68.7	394,544	181,230	180	50	21.6	53
Southern Pacific	1923	6,926	1,400,819	1,578,728	288,814	43,181	68.2	2,439,283	972,197	625	145	18.9	16
	1922	6,924	1,009,575	1,264,372	229,217	32,922	66.1	1,862,159	725,011	577	149	20.5	20
Union Pacific	1923	3,709	900,013	927,668	53,805	29,108	67.4	1,594,328	619,471	417	90	17.7	122
	1922	3,707	682,178	694,577	31,552	23,463	75.0	1,175,515	483,398	407	114	21.9	183
Southwestern Region:												
Gulf, Colo. & S. Fe	1923	1,897	236,390	244,202	4,903	5,604	67.0	324,200	145,472	111	27	19.6	15
	1922	1,895	193,258	202,557	5,007	5,115	66.0	285,403	124,221	127	23	15.4	33
Missouri-Kansas-Texas	1923	1,871	251,853	251,922	9,314	7,846	63.3	428,951	168,049	144	82	36.4	59
	1922	1,987	252,308	252,321	5,431	6,996	61.8	398,276	162,351	154	43	21.7	70
Mo.-Kans.-Tex. of Texas	1923	1,389	161,294	166,061	3,378	3,479	61.1	201,262	79,030	65	60	48.2	3
	1922	1,738	196,104	200,640	4,402	3,562	60.3	209,715	82,521	89	49	35.7	17
Missouri Pacific	1923	7,112	1,115,586	1,125,773	34,614	27,175	66.6	1,552,224	703,046	411	212	34.1	...
	1922	7,305	956,490	965,334	30,407	24,743	70.7	1,326,603	603,524	423	155	26.8	7
St. Louis-San Francisco	1923	4,683	835,657	849,004	15,721	15,695	64.3	805,550	377,555	364	131	26.5	20
	1922	4,683	891,157	905,176	15,177	16,549	62.9	980,499	427,299	363	87	19.3	11
Southern Pacific Lines (in Texas and Louisiana)[2]	1923	3,710	573,765	576,947	6,584	12,625	67.8	726,038	318,539	202	82	28.9	12
	1922	3,710	542,392	548,932	3,473	10,928	65.6	641,205	284,963	200	95	32.2	21
Texas & Pacific	1923	1,953	220,842	230,842	3,076	5,462	69.7	290,315	119,371	146	61	29.6	38
	1922	1,953	218,412	218,431	1,293	5,588	66.9	299,544	117,533	135	67	33.2	31

[1]No passenger-train service.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Compared with June, 1922, for Roads with Annual Operating Revenues above $25,000,000.

Region, road and year	Average number of freight cars on line daily: Home	Foreign	Total	Per cent unserviceable	Stored	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per loaded car	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles including locomotive and tender	Passenger service: Train-miles	Passenger-train car-miles
New England Region:														
Boston & Albany	1923 1,840	7,350	9,190	3.2	....	1,025	415	22.2	472	32.9	11,005	181	304,392	2,096,229
	1922 3,557	5,225	8,782	7.8	574	1,026	365	17.1	318	26.9	7,083	194	305,325	2,103,183
Boston & Maine	1923 13,217	22,706	35,923	9.8	....	1,146	488	22.7	292	18.7	4,279	166	836,469	4,719,750
	1922 16,760	14,285	31,045	18.2	1,531	1,101	428	18.2	224	16.8	2,833	150	814,309	4,611,464
N. Y., N. H. & Hartford	1923 19,363	27,040	46,403	15.9	....	1,258	542	22.9	219	14.0	5,137	160	1,030,540	6,797,884
	1922 24,496	15,743	40,239	25.1	573	1,246	478	17.7	171	13.4	3,476	151	1,021,833	6,583,867
Great Lakes Region:														
Delaware & Hudson	1923 8,522	9,550	18,072	7.5	....	1,771	929	34.7	716	31.2	14,606	187	196,813	1,099,310
	1922 11,656	5,018	16,674	7.9	4,408	1,539	691	24.8	322	18.8	6,049	186	193,925	1,076,491
Del., Lack. & Western	1923 13,902	11,024	24,926	3.9	....	1,747	810	26.0	588	33.3	14,761	187	493,058	3,696,780
	1922 17,973	6,679	24,652	11.7	30	1,555	624	19.6	365	26.3	9,051	157	488,205	3,599,080
Erie (inc. Chic. & Erie)	1923 24,931	28,115	53,046	10.4	....	2,120	1,002	27.7	622	32.1	14,285	125	652,171	5,160,975
	1922 38,437	16,410	54,847	18.3	6,796	1,862	776	23.3	366	24.2	8,698	139	662,403	4,926,366
Lehigh Valley	1923 20,793	15,691	36,484	5.7	48	1,737	881	29.7	491	23.1	13,599	164	348,865	2,882,542
	1922 32,096	8,136	40,232	12.0	8,191	1,654	725	24.0	292	17.9	8,916	158	338,635	2,725,018
Michigan Central	1923 10,757	20,030	30,787	8.1	....	1,754	700	21.4	431	30.5	7,260	114	588,353	5,250,395
	1922 16,491	13,095	29,586	17.8	....	1,695	654	19.8	363	27.4	5,876	114	562,983	5,066,533
New York Central	1923 58,319	97,734	156,053	9.5	....	2,193	1,005	28.1	504	28.5	12,165	115	2,588,445	21,209,008
	1922 89,864	47,209	137,073	18.8	15,296	1,961	793	21.4	313	21.5	6,635	113	2,501,388	20,588,826
New York, Chic. & St. L.	1923 3,451	11,950	15,401	10.4	....	1,564	633	21.3	681	47.3	8,559	120	152,029	888,401
	1922 5,857	8,890	14,747	14.5	1,063	1,470	577	19.5	618	46.0	7,435	109	150,491	857,764
Pere Marquette	1923 7,552	17,383	24,935	4.2	....	1,442	660	26.1	312	19.1	3,892	122	289,924	1,565,182
	1922 10,747	10,301	21,048	12.4	383	1,351	591	23.0	287	18.2	2,770	117	282,866	1,530,654
Pitts. & Lake Erie	1923 8,705	14,412	23,117	13.7	....	2,742	1,648	44.4	437	15.0	43,701	72	115,634	613,508
	1922 20,139	10,504	30,643	32.2	5,932	1,980	1,116	36.5	106	4.3	14,256	85	113,997	586,771
Wabash	1923 9,356	12,279	21,635	3.2	334	1,568	651	21.9	603	39.0	5,394	138	486,770	2,857,911
	1922 12,076	10,316	22,392	11.2	712	1,460	604	20.6	507	34.1	4,700	133	535,556	2,949,685
Ohio-Ind.-Allegheny Region:														
Baltimore & Ohio	1923 52,897	51,200	104,097	4.3	....	1,711	867	32.7	614	29.4	12,272	170	1,546,775	10,153,519
	1922 68,600	34,487	103,087	14.8	7,858	1,545	761	29.1	415	21.3	8,170	171	1,458,257	9,193,805
Central of New Jersey	1923 12,283	14,894	27,177	10.7	....	1,569	780	31.7	278	13.8	10,876	179	376,955	1,785,834
	1922 20,981	8,195	29,176	5.8	11,422	1,173	526	24.8	137	8.2	5,769	211	369,654	1,787,229
Chicago & Eastern Illinois	1923 12,081	4,993	17,074	19.9	931	1,462	696	27.2	308	17.3	5,557	179	231,445	1,454,440
	1922 15,912	4,946	20,858	14.6	7,317	1,371	614	24.9	224	14.5	4,949	150	210,304	1,361,476
Clev., Cin., Chic. & St. L.	1923 10,867	23,755	34,622	5.8	....	1,971	940	29.6	620	32.9	9,026	120	710,187	4,388,972
	1922 17,416	19,737	37,153	14.2	6,330	1,891	880	28.3	534	30.2	8,326	112	682,096	4,206,030
Elgin, Joliet & Eastern[1]	1923 8,463	8,516	16,979	9.2	....	2,286	1,243	42.5	344	12.3	12,699	106	.....	.....
	1922 8,914	5,578	14,492	11.6	40	2,172	1,151	37.5	247	9.8	7,798	120	.....	.....
Long Island	1923 1,463	5,720	7,183	2.4	....	752	295	23.8	63	4.6	1,151	404	229,113	1,367,593
	1922 2,126	3,090	5,216	4.8	109	629	216	19.5	58	5.1	767	388	222,296	1,312,964
Pennsylvania System	1923 159,950	120,492	280,442	4.3	1,554	1,805	910	34.2	565	25.8	14,549	138	5,197,108	35,389,846
	1922 202,720	80,888	283,608	13.0	34,267	1,614	742	27.6	351	19.2	9,135	138	4,961,892	33,013,522
Philadelphia & Reading	1923 14,884	22,209	37,093	4.6	....	1,689	909	36.2	560	23.4	18,578	168	533,686	2,428,587
	1922 25,006	11,355	36,361	4.7	9,507	1,431	707	30.5	301	15.0	9,768	176	493,985	2,278,772
Pocahontas Region:														
Chesapeake & Ohio	1923 29,330	17,613	46,943	6.2	....	2,386	1,332	40.6	811	32.8	14,905	115	468,767	2,850,860
	1922 35,713	16,346	52,059	14.5	678	2,486	1,368	42.7	713	28.2	14,573	114	440,680	2,524,121
Norfolk & Western	1923 26,106	13,833	39,939	5.2	....	2,272	1,227	42.4	887	34.5	15,906	173	397,604	2,472,457
	1922 29,063	11,743	40,806	5.3	....	2,323	1,261	44.3	1,054	41.7	19,299	152	387,372	2,394,028
Southern Region:														
Atlantic Coast Line	1923 15,659	14,055	29,714	9.2	....	1,267	522	21.7	443	31.1	2,705	125	696,769	4,522,426
	1922 18,189	10,087	28,276	15.3	....	1,197	440	18.5	350	29.6	2,008	118	687,309	4,282,524
Central of Georgia	1923 2,588	6,811	9,399	5.9	....	1,065	483	24.3	523	30.1	3,578	166	327,784	1,673,949
	1922 4,034	4,666	8,700	13.9	....	1,068	417	19.3	400	29.5	1,830	150	324,497	1,655,482
I. C. (inc. Y. & M. V.)	1923 34,496	33,770	68,266	6.7	2,012	1,684	747	27.3	729	41.5	8,041	132	1,492,941	8,939,041
	1922 40,041	24,967	65,008	11.4	4,025	1,656	686	25.8	641	41.1	6,794	127	1,416,621	8,221,856
Louisville & Nashville	1923 30,749	25,433	56,182	15.8	57	1,158	548	30.7	554	29.5	6,183	166	1,028,390	6,075,412
	1922 32,188	22,592	54,780	11.2	70	1,188	565	30.7	625	32.9	6,820	161	987,160	5,707,163
Seaboard Air Line	1923 10,218	10,162	20,380	25.1	....	1,193	489	21.2	361	24.7	2,072	152	546,847	3,252,427
	1922 12,564	9,846	22,410	34.6	....	1,146	444	20.2	294	22.5	1,865	157	532,930	3,009,837
Southern Ry	1923 27,563	31,109	58,672	8.2	....	1,180	508	23.6	449	28.7	3,792	190	1,319,986	8,082,578
	1922 34,664	23,159	57,823	18.6	....	1,143	456	20.7	352	25.7	2,932	177	1,255,603	7,316,971
Northwestern Region:														
Chic. & N. Wn.	1923 42,258	32,153	75,411	7.4	....	1,314	595	26.2	416	24.9	3,708	143	1,610,716	10,276,817
	1922 46,015	24,173	70,288	8.4	5,100	1,189	489	21.9	311	21.7	2,600	143	1,591,382	10,211,084
Chic., Milw. & St. P.	1923 45,609	33,708	79,317	9.0	....	1,433	633	25.0	451	28.1	3,248	134	1,470,097	9,282,300
	1922 51,069	22,416	73,485	17.0	....	1,404	612	23.3	405	26.1	2,696	137	1,450,427	9,183,440
Chic., St. P., M. & O.	1923 2,807	8,468	11,275	11.6	256	1,033	424	21.3	377	25.6	2,460	160	303,298	1,829,540
	1922 3,835	9,400	13,235	13.3	1,645	1,012	444	23.2	352	21.5	2,696	139	308,426	1,830,249
Great Northern	1923 44,111	9,776	53,887	8.5	....	1,967	986	31.1	525	26.8	3,425	124	973,833	6,133,666
	1922 45,090	5,993	51,083	14.2	....	1,859	901	29.4	493	26.6	3,045	117	978,907	6,238,557
M., St. P. & S. Ste. M.	1923 17,407	8,427	25,834	7.1	800	1,216	570	24.5	391	22.8	2,312	109	450,951	2,738,146
	1922 18,596	6,197	24,793	8.6	2,900	1,215	565	23.4	359	21.2	2,042	111	448,209	2,789,231
Northern Pacific	1923 29,774	11,633	41,407	10.2	840	1,654	740	26.2	493	28.8	3,179	125	831,488	6,241,979
	1922 34,092	7,954	42,046	11.4	159	1,655	744	24.8	466	28.1	3,067	122	885,396	6,378,567
Oreg.-Wash. R. R. & N. Co.	1923 5,592	5,127	10,719	5.0	....	1,383	621	25.7	397	23.6	1,949	198	248,403	1,867,688
	1922 7,232	2,043	9,275	3.0	2,831	1,274	572	24.2	406	23.2	1,723	198	256,198	1,865,299
Central Western Region:														
Atch., Top. & S. Fe	1923 47,566	21,078	68,644	7.5	14,823	1,495	551	21.0	424	31.4	2,951	145	1,736,589	13,689,086
	1922 50,377	12,589	62,966	8.4	10,691	1,523	594	21.8	440	30.3	2,828	134	1,732,194	13,905,498
Chicago & Alton	1923 7,406	7,128	14,534	8.4	....	1,451	671	27.5	471	26.5	6,779	135	289,224	1,798,714
	1922 9,971	4,776	14,747	3.7	1,200	1,251	488	21.2	269	21.4	4,360	169	277,118	1,621,391
Chic., Burl. & Quincy	1923 44,978	24,783	69,761	8.6	1,734	1,596	719	27.2	534	31.9	3,992	157	1,548,925	10,595,703
	1922 48,152	20,519	68,671	9.9	8,799	1,431	617	23.5	398	25.9	2,931	148	1,504,899	10,367,872
Chic., Rock I. & Pacific	1923 28,343	23,547	51,890	13.0	6,044	1,185	463	21.0	447	32.2	3,038	168	1,270,521	7,747,898
	1922 33,010	14,168	47,178	10.8	4,592	1,203	480	21.1	470	33.3	2,897	142	1,299,408	7,943,718
Denver & R. G. Wn.	1923 11,450	2,986	14,436	8.5	969	1,251	633	28.8	342	16.6	1,902	226	272,216	2,041,021
	1922 13,785	2,760	16,545	10.0	2,789	1,317	648	28.1	278	14.1	1,775	184	278,746	2,069,421
Oregon Short Line	1923 7,233	4,164	11,397	6.8	....	1,420	653	27.6	621	34.4	2,992	136	287,421	2,371,354
	1922 7,048	2,669	9,717	8.3	154	1,316	604	26.3	622	34.4	2,560	136	292,790	2,248,897
Southern Pacific	1923 19,449	28,188	47,637	3.5	1,457	1,741	694	22.5	680	44.3	4,679	138	1,471,577	12,262,485
	1922 23,588	22,334	45,922	5.5	5,248	1,694	659	22.0	526	35.9	3,490	140	1,471,410	12,727,102
Union Pacific	1923 16,692	12,326	29,018	11.9	....	1,771	688	21.3	712	49.6	5,568	146	905,430	8,100,376
	1922 17,481	6,428	23,909	15.3	3,540	1,723	709	20.6	674	43.6	4,346	130	917,064	8,148,019
Southwestern Region:														
Gulf, Colo. & S. Fe	1923 5,468	4,470	9,938	4.7	833	1,372	615	26.0	488	28.1	2,556	131	192,157	1,129,756
	1922 6,921	4,011	10,932	4.9	547	1,477	643	24.3	379	23.6	2,186	127	192,298	1,118,825
Missouri-Kansas-Texas	1923 7,422	7,022	14,444	7.5	2,810	1,703	667	21.4	388	28.6	2,994	125	266,522	1,827,768
	1922 8,858	7,069	15,927	7.1	5,620	1,579	643	23.2	340	23.7	2,723	129	289,265	1,927,742
Mo.-Kan.-Tex. of Texas	1923 236	8,576	8,812	10.0	450	1,248	490	22.7	299	21.5	1,896	152	246,795	1,513,849
	1922 275	9,835	10,110	7.3	1,589	1,069	421	23.2	272	19.5	1,583	145	266,007	1,619,075
Missouri-Pacific	1923 22,197	24,526	46,723	9.2	1,153	1,391	630	25.9	502	29.1	3,295	153	972,247	5,519,827
	1922 29,204	18,727	47,931	10.3	2,000	1,387	631	24.4	420	24.3	2,754	139	911,067	5,374,636
St. Louis-San Francisco	1923 17,804	14,699	32,503	7.9	2,415	1,072	452	24.1	387	25.0	2,687	180	737,563	4,270,586
	1922 20,451	12,324	32,775	7.4	....	1,100	479	25.8	435	26.7	3,042	163	739,144	4,267,652
Southern Pacific Line (in Texas and Louisiana)[2]	1923 6,210	13,537	19,747	5.8	400	1,265	555	25.2	538	31.4	2,862	122	538,045	3,596,509
	1922 7,624	11,717	19,341	8.3	1,393	1,182	525	26.1	491	28.7	2,560	121	2,534,962	3,546,387
Texas & Pacific	1923 3,619	6,311	9,930	10.4	....	1,258	517	21.9	401	26.3	2,038	138	280,676	1,802,089
	1922 5,686	4,966	10,652	19.3	....	1,371	538	21.0	368	26.1	2,006	132	285,742	1,855,106

[2]Includes Galveston, Harrisburg & San Antonio, Houston & Shreveport, Houston & Texas Central, Houston, East & West Texas, Iberia & Vermillion, Lake Charles & Northern, Louisiana Western, Morgan's La. & Tex. R. R. & S. S. Co., and Texas & New Orleans.

Change in Per Diem Rules 13 and 14

J. E. Fairbanks, general secretary of the American Railway Association, has announced that the revision of per diem rules 13 and 14, which have been the subject of recommendations by the committee on car service, have been adopted by a large majority, as shown by the returns of the letter ballot which was sent out on August 1; and the new rules become effective on September 1. The changes in these rules consist in additional details to better provide for the prompt and accurate settlement of reclaims where cars are delayed by reason of railroad errors.

U. S. Chamber of Commerce Sees President Coolidge

The position of American business on important economic questions facing the country were put before President Coolidge by a committee representing the Chamber of Commerce of the United States on August 20. The committee was headed by Julius H. Barnes, president of the Chamber. Other members were A. C. Bedford (Standard Oil Company), John H. Fahey (New York Evening Post), Lewis E. Pierson (Irving Bank, New York), Willis H. Booth (Guaranty Trust Company), Fred I. Kent (Bankers' Trust Company), Charles F. Weed (First National Bank of Boston) and Elliott H. Goodwin.

On the subject of railroad transportation the President was told that the Chamber stands for private ownership and private operation, under fair and just regulation, based upon recognition of the obligation of the railroads toward the public and likewise of the obligations of the public toward the railroads. As the result of a conference in which the leading railroad, motor and waterway authorities participated and which Secretary of Commerce Hoover attended, active Chamber committees of experienced men have been working for several months on certain phases of transportation, with the object of formulating a program of recommended transportation development and treatment. The conclusions of the several committees (six in number) will be submitted to a general transportation conference this Fall.

Others who have discussed railroad questions with the new President include Joseph B. Eastman of the Interstate Commerce Commission; L. E. Sheppard, president of the Order of Railway Conductors, and W. N. Doak, vice president of the Brotherhood of Railroad Trainmen.

Revenues and Expenses for June

The Interstate Commerce Commission's summary of railway revenues and expenses (Class I roads) for June and six months of 1923 is as follows:

	June		Six months	
	1923	1922	1923	1922
Average number of miles operated.....	235,606.29	235,800.32	235,779.23	235,725.88
Revenues:				
Freight	$387,343,495	$331,931,578	$2,270,959,645	$1,866,764,626
Passenger	[1]102,851,407	[2]96,043,861	[3]539,222,276	[4]503,037,047
Mail	7,598,366	7,470,869	45,518,072	44,718,860
Express	13,171,622	11,416,035	77,414,068	58,462,351
All other transportation	17,346,151	16,032,869	96,706,769	84,499,514
Incidental	12,332,139	10,236,970	63,485,867	52,144,250
Joint facility—Cr.	804,765	1,073,288	4,954,588	5,091,317
Joint facility—Dr.	181,904	171,375	1,338,547	1,040,990
Railway op. revenues	541,266,041	474,034,095	3,096,922,738	2,613,676,975
Expenses:				
M.w. and structures	77,241,548	70,465,977	375,437,312	346,472,420
Maintenance of equipment	124,811,736	102,426,771	731,666,569	591,209,850
Traffic	7,943,683	7,472,728	45,858,541	42,901,430
Transportation ...	189,635,361	167,035,236	1,191,589,340	1,000,449,445
Miscellaneous operations	4,469,327	4,272,737	24,471,633	22,786,798
General	13,871,305	13,187,425	80,425,260	79,005,504
Transp'n for investvestment—Cr. ...	962,079	582,357	4,381,138	2,783,445
Railway operating expenses	417,010,881	364,278,517	2,445,067,517	2,080,042,002
Net from railway operations	124,255,160	109,755,578	651,855,221	533,634,973
Railway tax accruals	28,176,247	26,794,704	160,137,804	148,158,570
Uncollectible	121,693	106,484	805,359	658,598
Railway operating income	95,957,220	82,854,390	490,912,058	384,817,805
Equipments rents—Dr. balance.....	6,233,579	5,154,902	36,572,175	27,072,909
Joint facility rent—Dr. balance.....	2,099,391	1,428,816	10,475,814	8,575,917
Net ry. op. income	87,624,250	76,270,672	443,864,069	349,168,979
Per cent exp.....	77.04	76.85	78.95	79.58

[1]Includes $3,368,231, sleeping and parlor car surcharge.
[2]Includes $2,863,169, sleeping and parlor car surcharge.
[3]Includes $17,331,104, sleeping and parlor car surcharge.
[4]Includes $15,023,064, sleeping and parlor car surcharge.

Traffic News

The Government of Ontario, owning and operating the Temiskaming & Northern Ontario Railway, announces that the through day express trains are to have dining cars.

The Canadian Pacific reports that, up to the 15th of August, 20 special trains carrying harvesters, 15,300 of them, had passed west through Sudbury, Ontario. The Maritime provinces supplied 2,600 of these men, Quebec 5,600, and Ontario 6,400; the others being from Europe.

The Central of Georgia is distributing a series of booklets describing the mines and deposits of kaolin and refractory clay in the state of Georgia adjacent to its line. Three booklets, which are reprints of articles appearing in the Journal of the American Ceramic Society, deal with the refractory possibilities of some Georgia clays, washing tests, and the use of sedimentary kaolin of Georgia in whitewares. A fourth pamphlet lists the mines and deposits of the clay in Wilkinson county.

Ira W. Gantt has been appointed general freight agent of the Canadian National, with headquarters at Buffalo, N. Y., in charge of freight traffic interchanged with trunk line connections at Niagara frontiers, local freight traffic originating at or destined to Black Rock, Buffalo or Suspension Bridge, N. Y., and freight traffic between the territory south of the Michigan-Indiana state line and points east of the Detroit and St. Clair rivers, via Grand Trunk junction points in Michigan. The position of assistant general freight agent has been abolished.

Secretary of Agriculture Suggests Rate Reductions on Eastern Roads

In a statement discussing the wheat situation, Secretary of Agriculture Wallace on August 20 made a suggestion that the eastern railroads could assist in improving the condition of the agricultural districts by making some reduction in freight rates on farm products. "How far the western grain carrying roads can go in this direction under the present operating expenses," he said, "I am not prepared to say; but the roads running east from western primary markets ought to be able to make some substantial reduction in freight rates on all grain, flour, livestock and meat products shipped, especially if destined for export. If our railroad rate men would take the farm situation to heart and get down and study it as one of their own problems, I believe they could help a great deal." In calling attention to the increases in prices which the farmer has to pay, Secretary Wallace said that wages in industry and on the railroads are almost twice as high as before the war and that freight rates are 50 to 75 per cent higher.

Railway Traffic for First Half of 1923

The railroads of the United States during the first six months this year carried the greatest freight traffic for any corresponding period in their history, according to tabulations made by the Bureau of Railway Economics, based on reports filed by the carriers. It amounted to 225,435,608,000 net ton miles. This was an increase of 7 per cent over the corresponding period in 1920, which was the previous record.

Compared with last year when the miners' strike was on the increase is more than 32 per cent. In the Eastern district, which was especially affected by the miners' strike, there was an increase over the first six months last year of 37.6 per cent; in the Southern district 29½ per cent, and the Western district 26 per cent.

The average movement per freight car during the month of June was 28.3 miles per day, the highest average for June since 1917. It also was an increase of 4.4 miles over June last year, and 6.3 miles over June, 1921, but a decrease of 3/10 of a mile under the daily average for May this year.

The average load per car in June was 28.2 tons, the highest average for any June since 1917, except in 1918 and in 1920.

Commission and Court News

Personnel of Commissions

A. J. Shields, examiner of accounts for the Interstate Commerce Commission, has resigned to enter the service of Patterson, Teele & Dennis, accountants and auditors, New York.

Court News

Forgeries in Bills of Lading

Where a bill of lading provides that alterations or erasures must be endorsed and signed by the agent issuing the bill, the New York Appellate Division holds that an alteration of the bill by the cancellation of the datings and the insertion of the new datings not in the original spaces therefor, put a bank loaning money thereon on inquiry, and the railroad company was not liable to the bank for loss, although the railroad had negligently delivered the goods without surrender of the bill, in the absence of a conspiracy between it and the consignor to defraud the bank.—Saugerties Bank v. Delaware & Hudson, 204 App. Div. 211, 198 N. Y. Supp. 722.

Carrier Not Liable for Rusting of Goods from Inherent Nature

The West Virginia Supreme Court of Appeals holds that, since a common carrier, if itself not at fault, is not an insurer against loss or damage caused by a natural infirmity or vice inherent in the goods carried, a railroad company, transporting a shipment of stoves, is entitled to defend an action for damage caused by the corrosion or rusting of the stoves in transit, on the ground that the corrosion is the result of a chemical union of acetic acid in the asbestos fire fronts and the metal surrounding it, and that there was no negligence on the part of the carrier causing such corrosion.—A. F. Thompson Mfg. Co. v. Chesapeake & Ohio (W. Va.), 115 S. E. 877.

Decision Under Federal Employers' Liability Act

The New Jersey Court of Errors and Appeals holds that a yard watchman safeguarding an interstate consignment, injured by a defective car door falling on him, was within the act.—Cork v. Lehigh Valley (N. J.), 119 Atl. 88.

The Iowa Supreme Court holds that taking empty coaches arriving from interstate service from the coachyards to a "Y," turning them around, and returning them for inspection, preparatory to being immediately used in interstate commerce, is service within the act.—Mulstay v. Des Moines Union Ry. Co. (Iowa), 192 N. W. 439.

The Nebraska Supreme Court holds that shoveling coal into a pit, to be elevated by machinery into a coal chute for immediate use in engines, used in both interstate and intrastate traffic, is service within the act.—Kibler v. Davis (Neb.), 192 N. W. 732.

The Missouri Court of Appeals (St. Louis) holds that an engine being prepared to take out a train of cars, some of which were loaded with interstate freight, was engaged in interstate commerce, and one employed in so preparing it was within the act.—Brimer v. Davis (Mo. App.), 245 S. W. 404.

The Missouri Supreme Court holds that a section hand injured while helping to put out a fire spreading from the right of way to haystacks, to save the railroad from damages, was not within the act.—Myers v. C. B. & Q. (Mo.), 246 S. W. 257.

The Circuit Court of Appeals, Sixth Circuit, holds that a switchman helping to break up a cut of cars containing both interstate and intrastate cars is within the act, though the particular car in which he was riding when injured was in intrastate use, his riding it being merely incidental to the placing of the caboose, which was in interstate commerce.—Davis v. Dowling, 284 Fed. 670.

Foreign Railway News

Powers Resent China's Taking Over Land Department of Chinese Eastern

The British, American, French and Japanese Ministers in Peking have addressed to the Chinese government a joint protest, based on the Washington resolution of February 4, 1922, against the taking over by the Chinese authorities of the administration of the land department of the Chinese Eastern Railway, according to a London dispatch to the New York Times.

The Harbin Soviet agent also protests against this action as an infraction of Russian rights in the railway.

France Adopts the Westinghouse Brake

The Superior Council of Railways of France has ratified the decision of a special commission appointed by the Ministry of Public Works adopting the Westinghouse air brake as the standard for French railways. The special commission tested three brakes, viz., the Westinghouse, the Lipkowski and the Clayton-Hardy vacuum. It is now proposed that the French Minister of Foreign Affairs should call a meeting of representatives of the allied countries in accordance with the Peace Treaty with the view of standardizing air brakes in continental Europe. The choice of the Westinghouse brake is said not to involve its exclusive use, but that any other similar pressure brake capable of being operated with the Westinghouse might be allowed.

New Railway for Gold Coast

The British Secretary of State for the Colonies has given his approval of the construction of a new railway in the central province of the Gold Coast Colony, according to Department of Commerce cables.

The new railway will start from Nuni-Valley Station on the existing Sekondi-Kumasi Railway, and will run thence to Kade in the northeastern portion of the central province, a distance of approximately 100 miles. The railway will be built departmentally by the colonial government, the estimated cost of construction being £1,134,000. Much of the necessary survey work has already been carried out, and it is hoped that it will be possible to start construction at an early date.

The Greek State Railway Situation

The physical and financial conditions of the government-owned railways of Greece are a matter of considerable concern to the state, according to Commerce Reports. Track and equipment are in poor condition and the volume of traffic is insignificant compared with what it should be. Shortage of labor and repair material, added to intensive traffic during and immediately after the war, left Greece, like other nations involved in the war, with a demoralized railway system.

The poverty of the Greek state has prohibited any except emergency remedies, and replacements have been almost out of the question. Earnings in pre-war years have been replaced by deficits that have resulted from costly working of inefficient locomotives, from increased wages, from higher repair costs, and from expensive track maintenance on low roadbeds that are subject to frequent washout or overflow.

Makeshift repairs have been made to roadbed and track, but extensive permanent repairs are greatly needed, particularly in elevation of roadbed. Many bridges should be strengthened or replaced; decayed ties are also in need of replacement. Greece does not produce rolling stock or other equipment, and imports have been delayed. Urgent temporary repairs needed to bring the lines and rolling stock up to date are estimated to cost 80,000,000 drachmas (roughly $2,640,000, at 1922 average of drachma exchange, $0.033012).

The state railways, having standard gage and a total length of 1,275 kilometers (1 km. = .621 mi.), comprise the following lines: Piraeus-Athens-Saloniki-Gevgeli (Yugo-Slav frontier), 598 kilo-

meters; branch lines, 46 kilometers; Saloniki-Monastir, 183 kilometers; and Saloniki-Dedeagatch, 448 kilometers.

The roadbed on both the Saloniki-Monastir line and the Piraeus-Gevgeli line is too low in many places; this is particularly true of the Athens-Saloniki and the Saloniki-Gevgeli sections, over which runs the Orient Express that links Athens with western Europe. There are frequent washouts, at times occasioning interruptions to traffic of 10 days' duration and necessitating repairs involving considerable expense. It has been said that the only remedy for this condition is to change the route of the line.

The reinforcement of the Athens-Saloniki-Gevgeli line by replacing the worn 70-pound rails with new 80-pound rails and by replacing the decayed wooden ties with steel ties weighing 150 lb. each has been projected, thus allowing the use of heavier engines and more economical maintenance of way. Steel ties in use on the lines from Saloniki to Monastir and Dedeagatch show a saving of 20 per cent in labor alone on upkeep, and are expected to last 50 years, compared with seven years for wooden ties. It is estimated that 600,000 steel ties would be necessary for the line from Athens to Gevgeli; the estimated cost of these improvements is 123,000,000 drachmas (roughly $4,000,000).

In the fall of 1922 there were 152 locomotives, 116 tenders, 242 passenger cars, 1,682 closed freight cars, 870 open freight cars and 3 cranes in use. Nine of these locomotives, however, were left in Asia Minor, and 20 per cent of the remainder and 30 per cent of the passenger cars were in bad order. The locomotives are small and of old design, except a few bought in the United States and some "armistice" engines turned over to Greece out of deliveries from Bulgaria and Germany. The cars are small and badly worn.

This rolling stock is insufficient for the carriage of articles of prime necessity. Merchandise worth approximately 15,000,000 drachmas was reported to be waiting for transportation near railroad warehouses, exposed to the weather in November, 1922. An added burden is put on the railroads by the need of supplies for the enormous and increasing number of refugees; some cars have been turned over exclusively for the carriage of refugee supplies from Saloniki. Some efforts have been made to secure new equipment, but the results have been of little consequence. New and larger locomotives and cars are needed, provided tracks and bridges are strengthened.

Freight rates and passenger fares were increased several times during 1922; in October of that year rates were raised 75 per cent and fares 50 per cent, the purpose being to increase rates in proportion to operating costs. In spite of this great advance, the returns have not produced sufficient income, and the operation of the government railroads continues to be a heavy burden on the state treasury, although the deficit for 1922 was expected to be smaller than in 1921. The deficit for the latter year was 10,824,000 drachmas, in comparison with a deficit of 2,180,298 drachmas in 1919 and a net surplus of 250,736 drachmas in 1914.

Various efforts have been made to secure a loan for railway rehabilitation. To this end, a legislative decree was published April 3, 1923, providing for the contracting of a loan. Under its provisions, the state railways must deposit a portion of their gross income from fares and freight each month with the National Bank of Greece. The portion may be as much as 15 per cent, and is to be fixed in each case by the Cabinet. The money is solely for the service of a loan to be contracted for indispensable technical works, materials, improvement of lines, and renewal of rolling stock. All details of the loan are subject to the approval of the Minister of Communications.

In addition to the foregoing measures, the Greek government for a year or more has been negotiating with various English, French, and American capitalists for the taking over of all the state railways, either by purchase or by concession for operation, with a view to improving existing lines and building new ones No definite results have been announced as yet.

THE RAILWAY SURGEONS' ASSOCIATION of Georgia, at its annual meeting in Atlanta on August 15, chose for president, for the ensuing year, Dr. Henry M. Michel.

THE SHOPMEN of the Central of New Jersey who went out on strike in July, 1922, have abandoned their strike. This action, according to Charles MacIntosh, leader of the strikers, is the result of a meeting held in Elizabeth, N. J., last week, attended by about 100 men. The road's shops were fully manned long ago by new men and by strikers who returned as new men.

Equipment and Supplies

Locomotives

THE LAKESIDE & MARBLEHEAD has ordered 1, 0-6-0 switching type locomotive from the Lima Locomotive Works.

THE SAVANNAH & ATLANTA reported in the *Railway Age* of May 12, as inquiring for 2 locomotives, has placed an order for 1 Mikado type locomotive with the Baldwin Locomotive Works.

THE KANAWHA & HOCKING COAL & COKE COMPANY, Cleveland, Ohio, reported in the *Railway Age* of July 21, as inquiring for 1 Mikado type locomotive, has ordered this equipment from the Baldwin Locomotive Works.

THE RICHMOND, FREDERICKSBURG & POTOMAC, reported in the *Railway Age* of August 11 as inquiring for 2 Mountain type and 2 Pacific type locomotives, has ordered the Mountain locomotives from the American Locomotive Company and the Pacific type from the Baldwin Locomotive Works.

Freight Cars

THE PHILADELPHIA & READING has arranged for the repair of 200 steel hopper cars with the Pressed Steel Car Company.

THE CANADIAN NATIONAL, reported in the *Railway Age* of July 28 as inquiring for 1,000 automobile cars, has ordered this equipment from the Pressed Steel Car Company.

THE CHICAGO & NORTH WESTERN, reported in the *Railway Age* of January 13, as having placed an order with the General American Car Company for 1,000 single sheathed box cars, is having 1,000 stock cars built instead.

THE PERE MARQUETTE, reported in the *Railway Age* of July 28 as inquiring for 500 steel underframes, has ordered 300 underframes from the Pressed Steel Car Company. These are to be used for refrigerator cars to be built in the railroad company's shops.

THE CHICAGO & ALTON, reported in the *Railway Age* of August 18 as inquiring for 350 steel gondola cars, 260 steel composite gondola cars and 250 automobile cars, is now inquiring for 250 composite gondola cars and for 360 composite gondola car bodies.

Machinery and Tools

THE NEW YORK CENTRAL will receive bids until 12 o'clock, noon, August 30, for the manufacture, delivery and erection of a 20,000 k.w. turbine generator and surface condenser for its Port Morris power station.

THE PERE MARQUETTE has placed orders for a number of tools including 3 axle lathes; a plate flanging clamp; 3 steam hammers of 1,500-lb., 2,500-lb., and 6,000-lb. capacity respectively; a locomotive axle journal turning lathe; a 100-in. tire boring and turning mill; a 36-in. planer; a 36-in. slab miller; a 66-in. vertical miller; 3, 5-ft. radial drills; a two-spindle rod borer and some miscellaneous types of tools including milling machines and lathes.

Signaling

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS has ordered from the Hall Switch & Signal Company, Garwood, N. J., 149 semaphore signals, electric motor, style L; 475 relays and 70 switch boxes.

THE OREGON SHORT LINE has ordered from the Union Switch & Signal Company apparatus for an electric interlocking at Idaho Junction, Idaho; 27 working levers in a 35 lever frame. The high signals in this plant will be semaphores, style B, low voltage, and the switch movements style M, though eight movements, model 13, now in service will be retained.

Supply Trade News

Day & Zimmermann, Incorporated, engineers, have removed their offices from 611 Chestnut street to 1600 Walnut street, Philadelphia, Pa.

The Flannery Bolt Company, Pittsburgh, Pa., has appointed the **W. S. Murrian Company,** with offices in the Cal Johnson building, Nashville, Tenn., as its southern representative.

J. P. Moses, who has been appointed general manager of railroad sales for **Joseph T. Ryerson & Son,** Inc., with headquarters in Chicago, to succeed H. A. Gray, resigned, as was announced in the *Railway Age* of August 11, has been in the service of the Ryerson Company for a period of over 22 years. Mr. Moses is well known in railway circles and for a number of years he specialized in high grade refined iron known as Ulster special which is used largely by the railroad companies for staybolt purposes. **H. T. Bradley,** who has been appointed manager of eastern railroad sales, with office in New York City, for Joseph T. Ryerson & Son, Inc., Chicago, as was announced in the *Railway Age* of August 11, has been serving the railroad field for many years in the east. Mr. Bradley entered the service of the Ryerson Company in 1906 and spent a great deal of his time as a sales engineer in the machinery department. For the past seven years, he has been associated with the railroad division as assistant manager. Although the company sells a complete line of iron and steel products to the railroads, Mr. Bradley has concentrated his efforts largely on staybolt iron and special railroad machinery.

J. P. Moses

H. T. Bradley

The Oilgear Company, Milwaukee, Wis., has appointed **The E. A. Kinsey Company,** 235 South Meridian street, Indianapolis, Ind., as the selling agent for Oilgear products in the states of Indiana, Kentucky and Tennessee.

J. **Leonard Replogle,** president and chairman of the executive committee of the **Vanadium Corporation of America,** New York, has resigned on account of ill health. Mr. Replogle remains as a director of the corporation.

The name of the Walsh Tie Company, Minneapolis, Minn., has been changed to the **Northern Tie and Treating Company.** There will be no change in personnel. This company operates a timber treating plant at Minneapolis.

E. **F. Boyle,** Monadnock building, San Francisco, Cal., has been appointed Pacific Coast representative for the **Grip Nut Company,** Chicago, and **J. L. Stephenson,** Munsey building, Washington, D. C., has been appointed a representative for the **Grip Nut Company** on certain railroads.

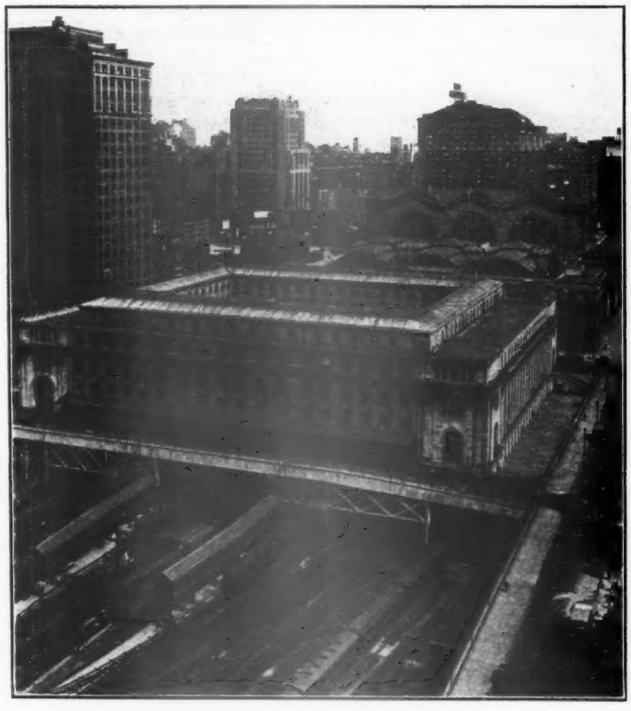
The National Lumber & Creosoting Company, Texarkana, Ark., has purchased the **Central Creosoting Company,** Chicago, Ill., and will transfer the headquarters to St. Louis, Mo. John T. Logan, president of the National Lumber & Creosoting Company has also been elected president of the Central Creosoting Company, succeeding J. B. Card. The Central Creosoting Company owns and operates a two-cylinder timber treating plant at Finney, Ohio.

Obituary

Waldo H. Marshall, chairman of the board and president of the Consolidated Machine Tool Corporation of America, New York and formerly president of the American Locomotive Company, died suddenly on August 23, at his country home in Barnstable, Mass.

Trade Publications

LOCOMOTIVE AND OTHER CRANES.—The Industrial Works, Bay City, Mich., has issued an elaborate catalog of its products commemorating the completion of a half-century of its existence. This book is a very elaborate presentation of the products of this company and is profusely illustrated with photographs showing details of the equipment and the manner of its use. Preceding the catalog section is an interesting history of the development of cranes from the days of the pyramids to the latest designs of the present day. This is followed by sections devoted to (1) locomotive cranes of rail, traction and crawling tractor types, and barge, wharf and gantry cranes; (2) crane accessories such as clam shell buckets, magnets and drag lines; (3) wrecking cranes ranging from 75 tons to 200 tons capacities; (4) special railway equipment such as pillar and transfer cranes, portable rail saws and transfer tables; (5) pile drivers, pile hammers, etc., and (6) facilities for foreign service. In addition to considerable detailed information regarding the products of the Industrial Works, the book contains much information of general interest to all users of equipment of this character.



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New York General Post Office with Pennsylvania Station in Background, Both Built Above P. R. R. Tracks

Railway Construction

ALEXANDRIA & WESTERN.—This company has awarded a contract to List & Gifford, St. Louis. Mo., for the construction of a five-mile extension from Alexandria, La., to McFarland, reported in the *Railway Age* of August 4th. The cost of the construction will be approximately $50,000.

CENTRAL PACIFIC.—The Interstate Commerce Commission has issued a certificate authorizing the construction of a line from a point near Oakridge to a point near Kirk, Ore., a distance of approximately 118 miles, which is commonly designated the Natron cut-off. The line will connect the ends of two branches owned by the Central Pacific and together they will form a new route between Weed, Calif., and Springfield Junction, Ore., 10.6 miles shorter than the present line, which is owned partly by the Central Pacific and partly by the Southern Pacific. The primary purposes are to develop local timber traffic and to complete an alternate line over which through traffic can be handled more economically than by the existing line. The estimated construction cost based on the location made in 1907 and 1908 is $16,182,616, including 20 tunnels which are estimated to cost $2,923,631. It is now proposed to use a maximum grade of 1.8 per cent instead of 1.5 per cent used in the former location.

CHESAPEAKE & OHIO.—This company has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the construction of water treating plants at Foster, Ky., Edgington, Stony Point, South Portsmouth and Maysville.

CITY OF BAYONNE, N. J.—Plans are being made for the development of a large rail-water terminal at this point and a public hearing will be held by municipal officers on the matter on August 28.

FLORIDA EAST COAST.—This company will receive bids on September 5 for the construction of a new station at Daytona, Fla., to cost approximately $45,000.

KANSAS CITY SOUTHERN.—This company is preparing plans for the reduction of grades between Watts, Ark., and Neosho, Mo., a distance of 62 miles, at a cost of approximately $3,000,000.

MISSOURI PACIFIC.—This company has begun the construction of a new general hospital at Little Rock, Ark., to cost approximately $450,000, as reported in the *Railway Age* of January 27.

OREGON SHORT LINE.—This company has awarded a contract to the Utah Construction Company, Salt Lake City, Utah, for the construction of the secondary main line from Orchard, Idaho, to Boise, estimated to cost over $3,000,000, which was reported in the *Railway Age* of March 3. The project includes the building of 27 miles of new track, 6 miles of side track, and a loop at Nampa, Idaho, three miles in length. Also included in the contract is the construction of new freight and passenger stations at Nampa and Boise.

PENNSYLVANIA.—This company has awarded a contract to the Scott Construction Company, Indianapolis, Ind., for the construction of a bridge over its tracks east of Terre Haute, Ind., to cost approximately $100,000.

SOUTHERN PACIFIC.—This company will soon call for bids for the construction of six miles of belt line around the city of Dallas, Texas.

SOUTHERN PACIFIC.—This company is completing surveys for the new 118 mile line from Oakridge, Ore., to Kirk, reported in the *Railway Age* of March 3. The construction of this line will begin immediately upon completion of the surveys.

ST. LOUIS-SAN FRANCISCO.—This company has filed application with the Missouri Public Service Commission for authority to discontinue operation of its stations at Gratiot and Lindenwood, St. Louis, Mo. If the necessary permission is obtained, a new passenger station for which plans are now being prepared, will be erected at Tyler and Frisco avenues.

Railway Financial News

BALTIMORE & OHIO.—*Annual Report.*—See excerpts from annual report for the year ended December 31, 1922, on adjacent pages.

BUFFALO, ROCHESTER & PITTSBURGH.—*Bonds Called.*—The Guaranty Trust Company of New York, trustee, has announced that $122,000 4½ per cent equipment bonds, series F, due April 1, 1927, have been drawn for redemption for the account of the sinking fund on October 1 next, at par plus interest.

GRAND RAPIDS & INDIANA.—*Annual Report.*—The annual report for the year ended December 31, 1922, shows a net income of $269,151 as compared with $779,045 in 1921. The income statement follows in brief:

	1922	Increase or Decrease
Mileage	477	.....
Rental received from lease of road	$780,748	—$13,837
Gross income	818,684	—609,434
Total deduction from gross income	549,532	—99,540
Net income	$269,151	—$509,894
Dividend of 2 per cent paid Aug. 15, 1922	115,834	.....
Dividend of 2 per cent paid Dec. 20, 1922	115,834	.....
Balance transferred	$37,483	—$509,894

LONG ISLAND.—*Asks Authority for Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority to issue $1,710,000 of 5 per cent 15-year equipment trust certificates to be sold at approximately 95.

LOUISVILLE & NASHVILLE.—*Bonds Sold.*—J. P. Morgan & Co. have sold $14,000,000 of first and refunding mortgage 5 per cent series B gold bonds of the Louisville & Nashville and $6,000,000 of series F equipment trust certificates of the same road. The bonds are to be dated August 1, 1921, and will bear interest from October 1, 1923. They will mature in 2003.

The equipment trust certificates will be dated September 1, 1923, and will mature annually in $400,000 lots from September 1, 1924, to September 1, 1938. The certificates were priced to yield 5.25 per cent. The sale of both the certificates and bonds is subject to the approval of the Interstate Commerce Commission.

MIAMI MINERAL BELT.—*Acquisition.*—See St. Louis-San Francisco.

MINNEAPOLIS & ST. LOUIS.—*Receivership.*—The Guaranty Trust Company of New York was on August 20 granted permission by Judge Wilbur F. Booth, in the Federal District Court at Minneapolis, to intervene and file a bill in its petition to foreclose a mortgage of $8,896,000 against the Minneapolis & St. Louis. Amendments to the original order appointing W. H. Bremner receiver were presented to Judge Booth for approval. The trust company asks that the income from that portion of the railroad property covered by the mortgage be segregated. The first mortgage is on the roadbed between Watertown and Leola, S. D., and Canby, Minn., and Lebeau, S. D. Changes in the receivership were agreed to in a conference between attorneys for the trust company and Mr. Bremner, limiting the power in some respects and extending it in others.

See also article on another page of this issue entitled "The Trouble with the Minneapolis & St. Louis."

NORTHERN PACIFIC.—*Annual Report.*—This company's annual report for 1922 is reviewed in an article on another page of this issue entitled "N. P. Not Reporting Good Earnings." See also excerpts from annual report on adjacent pages.

NEW YORK, CHICAGO & ST. LOUIS.—*Equipment Trusts Offered.*—The Guaranty Company and Lee, Higginson & Co. are offering $4,275,000 equipment trust 5 per cent gold certificates. These are to mature $285,000 each August 1, 1924 to 1938, and are being offered at prices to yield 5.25 per cent for the 1924 maturity, 5.30 per cent for the 1925 maturity, 5.35 per cent for the 1926 maturity and 5.40 per cent for the remaining maturities. The certificates are to be issued against not to exceed 80 per cent of the cost of new

(*Continued on page* 369)

Annual Reports

Twenty-sixth Annual Report of the Northern Pacific Railway Company

Office of the
NORTHERN PACIFIC RAILWAY COMPANY,
St. Paul, Minnesota.

April 5, 1923.

To the Stockholders of the
Northern Pacific Railway Company:

The following, being the twenty-sixth annual report, shows the result of the operation of your property for the year ending December 31, 1922.

INCOME ACCOUNT.

	1922	1921	Increase—I Decrease—D	
Average mileage operated.....	6,640.64	6,658.03	D	17.39
OPERATING INCOME				
Operating revenues—(see page 24)	$96,076,066.48	$94,538,059.44	I	$1,538,007.04
Operating expenses—(see pages 25 and 26).....	72,654,711.05	77,630,867.23	D	4,976,156.18
Net operating revenue.....	23,421,355.43	16,907,192.21	I	6,514,163.22
Railway tax accruals.....	8,430,583.11	9,014,120.50	D	583,537.39
Uncollectible railway revenues.	24,982.54	17,895.63	I	7,086.91
Railway operating income..	14,965,789.78	7,875,176.08	I	7,090,613.70
Equipment rents—net	2,566,625.53	1,445,605.83	I	1,121,019.70
Joint facility rent—net.....	1,918,099.16	1,523,044.26	I	395,054.90
Net railway operating income	19,450,514.47	10,843,826.17	I	8,606,688.30
NONOPERATING INCOME.				
Income from lease of road....	342,120.13	319,651.44	I	22,468.69
Miscellaneous rent income.....	638,982.68	698,165.20	D	59,182.52
Miscellaneous nonoperating physical property	44,516.91	104,544.58	D	60,027.67
Separately operated properties —profit	99,229.48	94,816.69	I	4,412.79
Dividend income	8,338,282.50	21,858,646.00	D	13,520,363.50
Income from funded securities.	1,048,570.15	2,346,638.70	D	1,298,068.55
Income from unfunded securities and accounts.....	758,448.47	806,462.67	D	48,014.20
Income from sinking and other reserve funds	149.99	47.92	I	102.07
Miscellaneous income	1,429.13	323,709.52	D	322,280.39
Total nonoperating income..	11,271,729.44	26,552,682.72	D	15,280,953.28
Gross income	30,722,243.91	37,396,508.89	D	6,674,264.98
DEDUCTIONS FROM GROSS INCOME.				
Rent for leased roads.....	51,320.66	51,320.65	I	.01
Miscellaneous rents	9,869.59	10,328.04	D	458.45
Interest on funded debt.....	14,992,473.37	14,480,679.83	I	511,793.54
Interest on unfunded debt....	67,646.14	10,631.28	I	57,014.86
Amortization of discount on funded debt	283,824.59	304,273.42	D	20,448.83
Miscellaneous income charges..	260,180.06	473,876.50	D	213,696.44
Total deductions from gross income	15,665,314.41	15,331,109.72	I	334,204.69
Net income	15,056,929.50	22,065,399.17	D	7,008,469.67
Dividend appropriations of income	12,400,000.00	17,360,000.00	D	4,960,000.00
Income balance for the year, transferred to profit and loss	$2,656,929.50	$4,705,399.17	D	$2,048,469.67

REVENUE TRAIN MILEAGE

Revenue passenger train miles during the year were 9,555,273, a decrease of 370,359 miles compared with the previous year.

Revenue freight and mixed train miles during the year were 10,237,094, an increase of 1,344,081 miles.

Revenue special train miles during the year were 21,268, an increase of 9,743 miles.

All revenue train miles during the year were 19,813,635, an increase of 983,465 train miles.

EARNINGS.

FREIGHT BUSINESS.

Freight revenue was $71,725,005.74, an increase of $2,478,500.68, or 3.58 per cent compared with the previous year.

The number of tons of revenue freight carried was 21,451,028, an increase of 3,780,866, or 21.40 per cent compared with the previous year.

6,021,158,972 tons of revenue freight were removed one mile, an increase of 731,374,618 tons one mile, or 13.83 per cent.

The average earnings per ton mile decreased from .01309 to .01191.

The revenue train load decreased from 594.82 to 588.17 tons. The total train load, including company freight, decreased from 700.49 tons to 680.58.

The number of miles run by revenue freight trains was 9,573,533, an increase of 1,370,704, or 16.71 per cent.

PASSENGER BUSINESS.

Passenger revenue was $15,551,897 21, a decrease of $1,463,257.94 or 8.60 per cent compared with the previous year.

Mail revenue was $1,657,161.94, a decrease of $42,673.21 or 2.51 per cent; making allowance for back mail pay received, there was an increase of $114,778.08, or 7.66 per cent.

Express revenue was $2,157,176.82, an increase of $75,635.22, or 3.63 per cent.

Sleeping car, parlor and chair car, excess baggage and miscellaneous passenger revenue was $1,020,876.00, an increase of $139,112.28, or 15.78 per cent.

Total revenue from persons and property carried on passenger and special trains was $20,387,111.97, a decrease of $1,291,183.65, or 5.96 per cent compared with the previous year.

The number of passengers carried was 5,263,440, a decrease of 914,856 over the previous year, and the number of passengers carried one mile was 473,992,323, a decrease of 31,769,614, or 6.27 per cent.

The number of miles run by revenue passenger trains was 9,555,273, a decrease of 370,359, or 3.73 per cent.

The average rate per passenger mile was 3.281 cents against 3.365 cents last year.

EARNINGS AND EXPENSES PER MILE OPERATED.

	1917	1918	1919
Operating revenues per mile.....	$13,526.37	$15,594.28	$15,282.27
Operating expenses per mile.....	8,171.39	10,857.13	11,934.71
Net operating revenue per mile.....	5,354.98	4,737.15	3,347.56
Taxes per mile.....	1,059.52	1,236.01	1,365.42
Net	$4,295.46	$3,501.14	$1,982.14

	1920	1921	1922
Operating revenues per mile.....	$16,996.59	$14,199.10	$14,467.89
Operating expenses per mile.....	15,177.88	11,659.73	10,940.92
Net operating revenue per mile....	1,818.71	2,539.37	3,526.97
Taxes per mile.....	1,519.34	1,353.87	1,269.54
Net	$299.37	$1,185.50	$2,257.43

RATIOS.

	1917	1918	1919	1920	1921	1922
Operating expenses to operating revenue	60.41%	69.62%	78.10%	89.30%	82.12%	75.62%
Taxes to operating revenue	7.83%	7.93%	8.93%	8.94%	9.53%	8.77%

CONDUCTING TRANSPORTATION.

The charges for transportation expenses were $36,801,628.01, an increase of $1,003,661.39, or 2.80 per cent, as against an increase in total operating revenue of 1.63 per cent.

MAINTENANCE OF EQUIPMENT.

The charges for maintenance of equipment were $18,064,615.39, a decrease of $3,761,201.63, or 7.23 per cent.

LOCOMOTIVES.

Total number of locomotives on active list December 31, 1921, the date of the last annual report.....		1,437
Additions:		
Locomotives remodeled	4	
Locomotive reinstated from inactive list.....	1	5
		1,442
Deductions:		
Locomotives sold during year, from active list.....		3
Total locomotives on active list December 31, 1922.....		1,439
In addition to the locomotives on active list there were:		
Withdrawn from service and on hand December 31, 1921.....		55
Less—Dismantled during year.....	23	
Rebuilt and reinstated on active list.....	4	
Transferred to active list.....	1	28
Leaving on hand locomotives withdrawn from service which may be sold		27

The purchase of 20 Pacific type passenger locomotives, 25 Mikado type and 4 Mallet type freight locomotives has been authorized and they will be delivered in 1923.

PASSENGER EQUIPMENT.

On December 31, 1922, the Company owned 1112 passenger train cars, a decrease of 15 cars, consisting of 9 cars destroyed, dismantled or sold and 9 cars transferred to miscellaneous equipment, less 2 cars transferred from miscellaneous equipment, and the purchase and installation of one Mack gasoline car.

During the year 107 passenger cars had steel underframes, steel platforms and steel sheathing applied; work being completed during July, and all passenger train cars in transcontinental service have now been strengthened and remodeled.

The 70 passenger train refrigerator cars authorized in 1921 were not received in 1922, but are promised for delivery in April, 1923.

Of the 2,750 freight train cars authorized during 1921 there were received during 1922, 829 refrigerator cars, the balance of the refrigerator cars were received in February, 1923; delivery of the other 1,750 cars, as well as 3,000 box cars, authorized during 1922, has been promised during 1923.

FREIGHT CAR SITUATION ON DECEMBER 31ST.

	1922	1922	Increase—I Decrease—D	
N. P. cars on line.....	26,463	38,319	D	11,856
Foreign cars on line.....	10,337	8,847	I	1,490
Total cars on line.....	36,800	47,166	D	10,366
N. P. cars on foreign lines.....	20,259	8,755	I	11,504
Number of cars unserviceable.....	3,581	3,960	D	379
Percentage of unserviceable to total cars on line	9.73	8.40	I	1.33
Number of cars requiring heavy repairs.....	1,860	3,170	D	1,310
Percentage of total cars on line.....	5.05	6.72	D	1.67
Number of cars requiring light repairs.....	1,721	790	I	931
Percentage of total cars on line.....	4.68	1.68	I	3.00

MAINTENANCE OF WAY AND STRUCTURES

The charges for maintenance of way and structures were $12,826,641.01, a decrease of $1,486,275.44 or 10.38 per cent.

BRIDGES.

During the year 112 bridges were replaced, of which 84, 19,646 feet in length, were replaced by timber structures, and 4 permanent and 24 timber structures were replaced in permanent form as follows:

Replaced by embankment	17 bridges, 7,222 lineal feet
Replaced by steel viaduct, plate girders, I-beams and reinforced concrete trestles	11 bridges, 1,077 lineal feet
Total	28 bridges, 8,299 lineal feet

In addition to changes referred to above, 20 temporary structures were constructed and 3 permanent bridges added to correct records; 245 culverts were rebuilt, 65 in temporary and 180 in permanent form.

There are now under construction 986 lineal feet of steel truss for double track; 728 lineal feet of girder and I-beam spans for double track and 273 lineal feet for single track; 88 lineal feet of reinforced concrete trestle for double track and 231 lineal feet for single track.

Block Signals and Interlockers.

Automatic block signals were installed between Mandan and Burleigh, North Dakota, and the installation on the remainder of the Dakota Division is nearing completion.

Automatic block signals are being installed between Dilworth, Minnesota, and Jamestown, North Dakota, which work will be completed in 1923. An additional contract has been authorized covering similar installation between Cheney, Washington, and Pasco, Washington, and when the work contemplated under this contract is completed, the main line of your railroad will be automatically block signaled the entire distance from St. Paul to the Pacific Coast.

New interlocking plants at Anglim and Buffington, Minnesota, are under construction.

Line Changes.

Minnesota: During 1922 contract was executed with the University of Minnesota, under which the Company agreed to abandon its present line through the center of the University Campus at Minneapolis, and construct a new line adjacent to the Great Northern right of way, crossing the extreme northwesterly corner of the Campus and passing over the Mississippi River on a new bridge to a connection with the tracks of the Minneapolis and St. Louis Railroad at the westerly end of the existing bridge. The expense involved in making this change, over and above what must have been expended if the line were to remain in its present position, is to be paid by the University. Construction was started in the spring of 1922, and it is expected that it will be finished in 1923.

Montana: A change of line is under construction between mile posts 156 and 157 on the Rocky Mountain Division, near Phileman, Montana, which will result in the elimination of a timber trestle 339 feet long and 50 feet high, and in a decrease of the curvature.

Miscellaneous.

The plant at Darling, Minnesota, for washing, screening and crushing gravel for ballasting purposes was completed during the year.

The work of reconstructing bridge 565 over the Yellowstone River near Billings, Montana, consisting of the extension of the masonry piers and the removal of the present single track spans and replacing by double track structure, has been under way during the past year; the substructure has been completed and the changing of the steel superstructure is under way.

GENERAL.

Financial Results of Operation.

The operation of your property, after all charges, resulted in Net Income of $15,056,929.50, a decrease over the previous year of $7,008,469.67. A general revival in business was in evidence during the latter part of the year throughout the territory served by your lines of railroad.

The volume of passenger business was 14.81 per cent less, and of freight business 21.40 per cent more than in 1921. The freight business was only exceeded in 1917, 1918, and 1920, and was considerably larger than in 1921 and practically the same as in 1919. The operating revenues of the company increased $1,538,007.04 or 1.63 per cent, while operating expenses were reduced $4,976,156.18, or 6.41 per cent. Net operating revenue increase $6,514,163.22, or 38.53 per cent.

The following table shows for the last eight and one-half years the percentage ratio of Net Railway Operating Income to Railway Property Investment, Material and Supplies on hand at the close of each year being included in the amount of the Railway Property Investment. Net Railway Operating Income is here taken to mean what, in the Transportation Act of 1920, it is defined as meaning; namely, the amount produced by deducting from Net Revenue from Railway Operations, Railway Tax accruals and Uncollectible Railway Revenues, and adding Equipment Rents and Joint Facility Rents.

Fiscal year ending:	Railway Property Investment Including Material and Supplies	Net Railway Operating Income	Return on Investment Per cent
June 30, 1915	$491,035,831	$23,750,070	4.84
June 30, 1916	494,610,960	32,456,353	6.56
Calendar year ending:			
December 31, 1916	498,225,699	33,446,012	6.71
December 31, 1917	512,950,626	30,491,140	5.94
December 31, 1918	526,323,059	24,217,342	4.60
December 31, 1919	528,333,822	14,368,479	2.72
December 31, 1920	540,259,557	7,949,458	1.47
December 31, 1921	544,496,786	10,843,826	1.99
December 31, 1922	550,332,639	19,450,515	3.53

Claim for Balance due from Government.

As stated in the last annual report, the claim of the Company for payment for the Guaranty Period of six months ended August 31, 1920, is before the Interstate Commerce Commission; $12,000,000 has been received on account and it is expected a final adjustment will be made in the year 1923.

Valuation Work.

The Bureau of Valuation of the Interstate Commerce Commission continued its work of valuing your property, and by the early part of 1923 had served preliminary engineering, land and accounting reports not only for the Northern Pacific, but also for the Gilmore and Pittsburgh Railroad Company, Ltd., the Duluth Union Depot and Transfer Company and the Minnesota and International Railway Company.

Statements of objections to the values found by the Bureau have been filed by your officers as it is felt that in many cases the unit prices used by the Bureau are too low and in consequence that the values stated in the reports are too low. It is hoped that consideration will be given to the objections made and that increases will be granted before the Commission serves the tentative valuation reports required under the Transportation Act.

The number of company employes engaged in this work at the present time is 76, and the total expenditure for the company's proportion of the work up to December 31, 1922, was $1,835,683.80. The major portion of this work has been completed and from now on the company's expenses on this account will be substantially less than they have been in the past few years.

Land Department.

The operations of the Land Department for the year are summarized in the statements appearing on pages 42 and 43.

Conditions throughout the company's territory affecting the occupants of land have improved to some extent since last year, although in Western North Dakota and Eastern Montana stock growers and farmers have found it difficult to finance their operations.

The timber industry in Washington, Oregon and Idaho has been prosperous. Timber that is accessible is being actively sought for at advancing prices. A number of timber sales of considerable magnitude were made during 1922, and upon these large cash payments were collected.

The area of lands sold during the year exceeded that of the previous year, but cancellations of old sales exceeded new sales by 185,841.52 acres, thus accounting for the deficit in net proceeds as shown in the statement. Those contracts which required cancellation because of default and abandonment are being cleared away as rapidly as possible in order that the land may be ready for re-sale. Receipts on account of principal and interest were about the same as in 1921.

Oil Development.

The outstanding events in oil development in Montana during 1922 were the discoveries of oil in the Kevin-Sunburst Field, otherwise known as the Sweetgrass Arch, and in the second sands in the West Dome of the Cat Creek Field.

The Sweetgrass Arch lies along the Great Northern Railway Company's line, between Shelby and the International Boundary. The oil so far produced in this field is low grade and all of the 22 wells producing oil at the end of the year must be pumped. The Illinois Pipe Line Company has built a pipe line connecting the wells with the railroad, and this line has now been extended to Coutts, Alberta, just across the boundary. Drilling was in progress in 19 wells in this territory when the year closed.

Production of large quantities of oil from the second sand in the West Dome of the Cat Creek Field of the same character and quality as that heretofore found in the first sand resulted in increased activity in that locality. At the end of the year oil was being produced from the first and second sands in 115 wells. During 1922, 2,357,324 barrels were produced, making the total of 4,468,636 barrels from the beginning in August, 1920.

The exploration and drilling work of the Absaroka Oil Development Company was continued throughout the year. No oil was discovered in the several wells drilled either by it or by others proceeding under permits from it, but much valuable geological information was obtained. The Absaroka Company has arranged to drill during 1923 two deep test wells, one in the Devils Basin, and the other at a location on the Glendive-Baker Anticline, about 25 miles southeast of Baker, Montana. The Northwestern Improvement Company now owns all of the stock of the Absaroka Company.

Subsidiary Companies.

On page 44 will be found results of the Spokane, Portland and Seattle Railway Company together with its subsidiaries, the Oregon Trunk, Oregon Electric and United Railways, and on page 45 the results of the operation of the Minnesota and International Railway Company.

The United Railways Company acquired from the Oregon American Lumber Company the capital stock of the Portland, Astoria and Pacific Railroad Company and the facilities of the Nehalem Boom Company near Portland, and completed in 1922 the construction of the line of railroad to Keasey, Oregon—32.6 miles.

Retirement of Joint Bonds.

The Company's last annual report showed that of its proportion ($115,000,000) of the Northern Pacific-Great Northern C. B. and Q. Joint Collateral 6½% Bonds only $9,950,400 were converted on December 31, 1921. The balance of these bonds, $105,049,600, was retired during 1922 by issuance of Refunding and Improvement Mortgage 6% Bonds Series B, redeemable as an entirety on and after July 1, 1936, on any interest date at 110% and accrued interest, and 5% Bonds Series C, redeemable as an entirety on and after July 1, 1952, on any interest date at 105% and accrued interest. The amount of Refunding and Improvement Mortgage Bonds outstanding December 31, 1922, issued for conversion of the 6½% Joint Bonds was:

Series B	$107,295,600.00
Series C	8,702,300.00
Total	$115,997,900.00

The retirement of the joint bonds resulted in a net annual saving in interest of $602,149.00.

Freight and Passenger Traffic.

By order of the Interstate Commerce Commission rates on agricultural products and livestock were reduced January 1, 1922. A subsequent order provided in effect that the rates after July 1 should not exceed 90 per cent of the post-war rates authorized by the Commission; therefore the average of freight rates charged in 1922 was considerably below the average rates in 1921, and the average of rates in 1923 will be yet lower because the business will show the full effect of reductions ordered in 1922.

The general strike of coal miners which began April 1, and the railway shopmen's strike which began on July 1, prevented the full realization of expected increases in earnings during the last half of the year. The movement of freight was retarded and the derangement of car distribution and inability to obtain return of Northern Pacific cars loaded to off-line destinations caused a progressive car shortage which reached its extreme point in November, when the number of box cars on Northern Pacific rails was reduced to 13,654, or only 54 per cent of the number owned by this company. In the case of some commodities like grain, this resulted only in a postponement of the movement, but a relatively large part of this company's freight revenue comes from the transportation of lumber and other freight which must be handled when it is offered or the business is lost.

The volume of coast-to-coast traffic passing through the Panama Canal is increasing rapidly. The Commerce Act requires rates to be made according to the long and short haul rule, but the Interstate Commerce Commission may authorize lower rates to the farther points to meet water competition or for other sufficient reasons. Before the War the transcontinental railroads were permitted to make exceptional rates to Pacific Coast terminals to meet the competition of ocean carriers. With the discontinuance of steamship service in the war period the terminal rates were raised to the level of the intermediate rates. When steamship service was restored after the War, the transcontinental railroads, in accordance with the law, and for the purpose of meeting the competition through the Canal, applied to the Commission for authority to make to Pacific Coast terminal points, on a limited list of commodities peculiarly susceptible to water competition, rates lower than the rates charged for this carriage of the same commodities to intermediate points. After many hearings and much discussion the application was denied, and the railroads are now in a position where it is impossible to meet ocean competition at terminal points like Seattle, Tacoma and Portland without making in the rates to intermediate points reductions involving losses out of all proportion to any possible gains in connection with business moving to the terminal points.

The Company believes that Congress did not intend to exclude the rail-

roads from participation in this business; that on the contrary discretionary authority to make exceptional rates was given to the Interstate Commerce Commission for the very purpose of protecting the railroads against loss of business which they were handling and could profitably handle in competition with the water carriers; it expects, therefore, to join the other transcontinental railroads in renewing their application.

If permitted to make the necessary reductions in rates to and from Pacific Coast terminal points it will be possible to regain much of the traffic which has been lost, with resulting increase of net earnings. The westbound traffic to Pacific Coast terminal points is especially desirable because the preponderance of eastbound tonnage makes it possible to increase the westbound loaded car movement without any appreciable increase in operating costs.

Railroad passenger earnings have been greatly reduced by the development of the automobile and by the increasing use of the long distance telephone. Passenger earnings show a decrease of 8.6 per cent compared with those of the previous year. Other western roads show similar decreases. The strike of shop employes and the threat of a general railroad strike had an unfavorable influence on passenger travel, especially upon the summer tourist business; but even if conditions had been normal there would yet have been a decrease in passenger earnings due to automobile competition.

Comparative Statement of Payrolls.

A further reduction was effected in payrolls, due to some reductions in wages authorized by the United States Labor Board.

Comparison for a period of years follows:

Total payroll for year ending June 30, 1915	$24,486,852.00
Total payroll for year ending December 31, 1916	28,204,669.00
Total payroll for year ending December 31, 1917	35,877,879.00
Total payroll for year ending December 31, 1918	49,632,127.00
Total payrll for year ending December 31, 1919	52,605,396.00
Total payroll for year ending December 31, 1920	66,503,794.00
Total payroll for year ending December 31, 1921	50,643,526.00
Total payroll for year ending December 31, 1922	49,041,401.00

Security Owners and Employes.

There are now about 38,000 owners of stock and 30,000 owners of bonds of the Company. The average number of employes in 1922 was 28,190 and on March 15, 1923, 29,572.

Shop Strike.

A nation-wide strike of the six railroad Shop Crafts was called on July 1, 1922, and of the Firemen and Oilers on July 17, 1922. Of a total of 8,648 men employed in your company's shops and roundhouses on June 30, 8,134 left the service, leaving only 514 employes, or about 5¼ per cent of the force of these classes, at work, and of these only 173 were classed as skilled workers.

The differences between the striking employes and the management of your company were only slight, and a basis of settlement, satisfactory both to the men and the management, was agreed upon shortly after the strike began. The chief officers of the Federated Shop Crafts, however, refused to allow the strike to be settled on any one railroad, or upon any basis other than a national one, and in consequence of this refusal the strike continued.

The splendid response of employes of other departments to a call for volunteers was of the greatest assistance during the early and critical period of the strike and enabled the management to carry on the operation of your property without serious interruption.

In February, 1923, the striking employes, on their own motion and by their voluntary action, formally declared the strike off. In the meantime, however, most of the strikers' places had been filled, and to the deep regret of the management it was found necessary to reject the applications for re-employment of many men having long records of faithful service. Our employes in the various shop crafts have now formed an organization of their own, in no way affiliated with the National Organization of the Federated Shop Crafts, and the relations between the new organization and the management of your company are most satisfactory.

Anti-railroad Propaganda.

The Transportation Act, 1920, directs the Interstate Commerce Commission so to adjust rates and fares as that "carriers as a whole (or as a whole in each of such rate groups or territories as the Commission may from time to time designate) will, under honest, efficient and economical management and reasonable expenditures for maintenance of way, structures and equipment, earn an aggregate annual net railway operating income equal, as nearly as may be, to a fair return upon the aggregate value of the railway property of such carriers held for and used in the service of transportation."

In exercise of the discretion given to it by this law, the Commission has decided that an annual return of 5¾ per cent upon this aggregate value would be such a "fair return" as the law contemplates. In no year since the act became effective has the annual return equalled this amount, and in this aspect the act may be said to have failed to accomplish its purpose; but it stands as at least a legislative recognition of what the railroads are in justice entitled to, and is so far of value. Nevertheless, a deliberate and persistent attempt is now being made in certain quarters to create a sentiment in favor of the repeal of this provision of the law. As the law itself amounts to no more than a declaration of a purpose to do justice (even though, as many consider, only scanty justice) to the carriers, its repeal could be construed only as a denial of any such purpose. As stockholders, and therefore as owners of railroad property, you are interested in preventing the success of this movement; and your directors urge you earnestly to make your influence felt in opposition to it.

By order of the Board of Directors,

HOWARD ELLIOTT, Chairman.
CHARLES DONNELLY, President.

GENERAL BALANCE SHEET, DECEMBER 31, 1922.

ASSETS.

	1922	1921	Increase or Decrease
INVESTMENTS.			
Road and Equipment:			
Road	$442,484,934.00	$437,779,244.79	$4,705,689.21
Equipment	90,686,035.77	88,471,598.69	2,214,437.08
General	3,316,144.70	3,192,835.78	123,308.92
	536,487,114.47	529,443,679.26	7,043,435.21
Sinking Funds	22,501.47	4,808.54	17,692.93
Deposits in Lieu of Mortgaged Property (Net moneys in hands of Trustees from sale of land grant land, etc.)	788,519.97	430,704.77	357,815.20
Miscellaneous Physical Property	7,919,152.27	7,639,109.57	280,042.70
Investments in Affiliated Companies.			
Stocks	144,075,276.01	144,035,477.01	39,799.00
Bonds	31,065,697.75	31,065,697.75	.....
Notes	2,388,699.35	8,489,399.35	—6,100,700.00
Advances	3,374,931.19	3,148,469.99	226,461.20
	180,904,604.30	186,739,044.10	—5,834,439.80
Other Investments.			
Stocks	1.00	1.00	.....
Bonds	10,025,628.96	9,529,180.11	496,448.85
U. S. Treasury certificates of indebtedness	1,000,078.12	4,133,893.28	—3,133,815.16
U. S. Treasury notes	9,077,437.50	510,000.00	8,567,437.50
Contracts for sale of land grant lands	10,316,032.37	12,085,607.89	—1,769,575.52
	30,419,177.95	26,258,682.28	4,160,495.67
Total Capital Assets	756,541,070.43	750,516,028.52	6,025,041.91
Current Assets.			
Cash	10,325,432.12	17,307,315.44	—6,981,883.32
Time drafts and deposits	1,000.00	3,183.81	—2,183.81
Special deposits	9,661,166.55	1,984,428.25	7,676,738.30
Loans and bills receivable	1,005.30	1,073.19	—67.89
Traffic and car service balances receivable	1,980,614.72	1,640,122.97	340,491.75
Net balances receivable from agents and conductors	1,117,733.25	970,309.29	147,423.96
Miscellaneous accounts receivable	5,180,779.48	6,309,975.54	—1,129,196.06
Material and supplies	13,845,525.11	15,084,505.51	—1,238,980.40
Interest, dividends and rents receivable	318,857.40	263,145.93	55,711.47
Other current assets	153,440.52	102,930.48	50,510.04
Total Current Assets	42,585,554.45	43,666,990.41	—1,081,435.96
Deferred Assets.			
Working fund advances	29,127.36	41,123.38	—11,996.02
Due from U. S. Government account various transactions	2,360.63	2,581.60	—220.97
Other deferred assets	25,160.29	17,578.49	7,581.80
	56,648.28	61,283.47	—4,635.19
Unadjusted Debits.			
Rents and insurance premiums paid in advance	35,099.99	37,699.99	—2,600.00
Balance of Guaranty due from Government	2,760,606.14	2,760,606.14	.....
Discount on funded debt	2,000,573.75	8,888,150.80	—6,887,577.05
Other unadjusted debits	4,159,566.79	2,139,016.80	2,020,549.99
	8,955,846.67	13,825,473.73	—4,869,627.06
	$808,139,119.83	$808,069,776.13	$69,343.70

LIABILITIES.

	1922	1921	Increase or Decrease
STOCK.			
Capital stock—common	$248,000,000.00	$248,000,000.00	.....
GOVERNMENTAL GRANTS.			
Grants in aid of construction	21,193.73	9,730.31	$11,463.42
LONG TERM DEBT.			
Funded debt (see page 22)	328,206,900.00	453,513,600.00	—125,306,700.00
Less—held by or for the Company	8,924,500.00	138,974,100.00	—130,049,600.00
	319,282,400.00	314,539,500.00	4,742,900.00
Total Capital Liabilities	567,303,593.73	562,549,230.31	4,754,363.42
CURRENT LIABILITIES.			
Traffic and car service balances payable	808,986.82	807,164.97	1,821.85
Audited vouchers and wages payable	8,597,510.99	6,717,589.59	1,879,921.40
Miscellaneous accounts payable	606,304.58	523,208.91	83,095.67
Interest matured unpaid	5,205,610.75	2,043,550.50	3,162,060.25
Unmatured dividends declared	3,100,000.00	4,340,000.00	—1,240,000.00
Unmatured interest accrued	546,417.66	477,067.85	69,349.81
Unmatured rents accrued	6,147.20	6,147.05	.15
Other current liabilities	203,957.52	131,537.75	72,419.77
Total Current Liabilities	19,074,935.52	15,046,266.62	4,028,668.90
DEFERRED LIABILITIES.			
Due U. S. Government account various transactions	133,291.16	138,975.88	—5,684.72
Other deferred liabilities	177,096.18	61,932.07	115,164.11
	310,387.34	200,907.95	109,479.39
UNADJUSTED CREDITS.			
Tax liability	6,213,052.20	6,447,337.39	—234,285.19
Operating reserves	227,102.75	342,030.33	—114,927.58
Accrued depreciation of equipment	37,409,531.79	39,034,608.99	—1,625,077.20
Other unadjusted credits	1,646,257.15	1,318,874.73	327,382.42
	45,495,943.89	47,142,851.44	—1,646,907.55
CORPORATE SURPLUS.			
Additions to property through income and surplus	293,541.04	217,801.65	75,739.39
Funded debt retired through income and surplus	15,705,056.54	15,467,623.04	237,433.50
Miscellaneous fund reserves	401,226.92	330,152.43	71,074.49
	16,399,824.50	16,015,577.12	384,247.38
Profit and loss balance	159,554,434.85	167,114,942.69	—7,560,507.84
Total Corporate Surplus	175,954,259.35	183,130,519.81	—7,176,260.46
	$808,139,119.83	$808,069,776.13	$69,343.70

[ADVERTISEMENT]

The Baltimore and Ohio Railroad Company

BALTIMORE, Md., June 27, 1923.

To the Stockholders of The Baltimore and Ohio Railroad Company:

The President and Directors of the Company submit herewith report of the affairs and operations of the Company for the calendar year 1922.

PROPERTY OPERATED.

The mileage of the properties operated as The Baltimore and Ohio Railroad Company is shown in detail in Table 18, and may be summarized as follows, viz.:

	First Main Track.	Total all Tracks.
Miles owned and operated	4,990.34	9,837.87
Miles operated under lease	150.11	343.28
Total miles owned, leased and operated	5,140.45	10,181.15
Miles operated under trackage rights	71.60	140.42
Total operated mileage	5,212.05	10,321.57

There was a net increase of operated mileage during the year of 24.87 miles of first main track due to the inclusion of the Morgantown and Kingwood Railroad Company which was operated throughout the year as an integral part of The Baltimore and Ohio Railroad Company, and to the exclusion of the mileage of the Sunday Creek Railroad Company, with attendant trackage rights, owned, but not now operated.

The equipment belonging to the properties embraced in the owned mileage as above is shown in Table 17, and consists of:

2,683 Locomotives.
97,125 Freight Train Cars.
1,300 Passenger Train Cars.
2,376 Work Train Cars and other Work Equipment.
176 Tug Boats, Car Floats and other Marine Equipment
Miscellaneous Equipment of various kinds.

The results of the operations of five subsidiary companies for the year 1922 are shown separately. The net gain or loss resulting from such operations has been absorbed by The Baltimore and Ohio Railroad Company, so that the net income of the parent Company represents the net income of the entire Baltimore and Ohio System.

The Company and its subsidiaries operate a total of 5,387.24 miles of first main track.

OPERATIONS FOR THE YEAR.

The income account of the Company for the year 1922 will be found in Table 1.

The beginning of the year 1922 gave promise of a recovery from the business depression that had prevailed throughout the country during the entire year of 1921. The anticipated revival in business, however, was adversely affected by occurrences that produced abnormal conditions, especially with respect to railroads.

The first of these occurrences was the strike of the anthracite and bituminous coal miners which began in April, 1922, and continued until late in

TABLE 2. GENERAL BALANCE SHEET. YEAR ENDED DECEMBER 31, 1922.

ASSETS.

					Comparison with December 31, 1921.
INVESTMENT IN PROPERTY USED IN TRANSPORTATION SERVICE:					
Investment in Property Directly Owned:					
Road			$248,725,359.72		
Equipment			164,670,409.38		
				$413,395,769.10	
Investment in Subsidiary Companies Operated as Constituent Parts of the Company				296,499,601.06	
Investment in Miscellaneous Physical Property Held for Transportation Purposes				4,956,440.57	
Investment in Improvements to Leased Railway Property				81,244.60	
Investment in Perpetual Leaseholds—Capitalized (per contra)				6,441,200.00	
Total Property Investment as related to Railway Operating Income				$721,374,255.33	I $14,341,403.97
OTHER INVESTMENTS:					
Investment in Subsidiary and Affiliated Companies Separately Operated:	PLEDGED.	UNPLEDGED.	TOTAL.		
Stocks	$7,101,023.73	$3,950,855.59	$11,051,879.32		
Bonds	35,800,000.00	1,347,501.00	37,147,501.00		
Miscellaneous	.....	6,991,039.03	6,991,039.03		
Total	$42,901,023.73	$12,289,395.62	.....	$55,190,419.35	
Investment in Other Miscellaneous Physical Property				4,482,100.49	
Investment in Sinking Funds:					
Securities of Carrier's Own Issue			$178,000.00		
Other Assets			2,612.86	180,612.86	
Deposits in Lieu of Mortgaged Property Sold				51,703.58	
Investment in Other Companies:	PLEDGED.	UNPLEDGED.	TOTAL.		
Stocks	$21,936,187.96	$279,144.06	$22,215,332.02		
Bonds	117,000.00	490,791.27	607,791.27		
Miscellaneous	.....	1,233,872.02	1,233,872.02		
Total	$22,053,187.96	$2,003,807.35	.....	$24,056,995.31	
Total Other Investments				$83,961,831.59	I $38,585.26
Grand Total of all Investments				$805,336,086.92	I $14,379 989.23
CURRENT ASSETS:					
Cash				$13,737,199.65	
Special Deposits				4,479,627.09	
Loans and Bills Receivable				118,637.41	
Traffic and Car Service Balances Receivable				6,086,550.90	
Net Balances Receivable from Agents and Conductors				6,995,474.23	
Miscellaneous Accounts Receivable				11,214,054.60	
Material and Supplies				18,426,276.63	
Interest and Dividends Receivable				18,292.53	
Rents Receivable				27,593.38	
Total Current Assets				$61,094,706.42	D $9,871,838.00
DEFERRED ASSETS:					
Working Fund Advances				$92,023 08	
Insurance Fund:					
Securities of Carrier's Own Issue			$846,000.00		
Other Assets			610,613.20	1,456,613.20	
Other Deferred Assets				126,904.97	
United States Government Transportation Act of 1920				9,371,575.43	
United States Railroad Administration				74,809,692.56	
Total Deferred Assets				$85,856,809.24	I $1,603,914.35
UNADJUSTED DEBITS:					
Rents and Insurance Premiums Paid in Advance				$30,379.85	
Other Unadjusted Debits (interdepartmental accounts in process of adjustment)				4,067,614.36	
Total Unadjusted Debits				$4,097,994.21	I $1,919,953.82
SECURITIES OF CARRIER'S OWN ISSUE:	PLEDGED.	UNPLEDGED.	TOTAL.		
Preferred and Common Stocks	$.....	$1,513,858.51	$1,513,858.51		
Washington Branch Stock (per contra)	1,650,000.00	.....	1.650,000.00		
Bonds	49,721,550.00	15,707,655.00	65,429,205.00		
Total Securities of Carrier's Own Issue	$51,371,550.00	$17,221,513.51	.....	$68,593,063.51	I $3,942,020.00
Grand Total				$1,024,978,660.30	I $11,974,039.40

I indicates increase.
D indicates decrease.

August, during which period the shortage in coal production became more or less acute, occasioning in some instances the cessation of industrial activity and also the issuance by the Government of coal priority orders for the protection of public institutions and essential industries. As coal and coke together constitute about fifty percent of the Company's tonnage the coal strike naturally had a serious effect upon its revenues.

Notwithstanding the coal strike there was a gratifying increase in the Company's general business for the first six months of the year, during which period the tonnage handled, excluding coal and coke, increased nearly twenty-five percent over the same period of the preceding year.

The second occurrence of major importance was the nation-wide strike of railway machinists, blacksmiths, sheet metal workers, boiler makers, firemen and oilers, electrical workers, carmen, helpers and apprentices, commonly referred to as the "Shop Crafts," which began on July 1, 1922, and in the case of your Company terminated by an agreement dated September 15, 1922. The cause of this strike was the refusal of the shop crafts to accept an award of the United States Railroad Labor Board authorizing a reduction in the scale of wages of these and other workers to be effective from July 1, 1922. As the result of the strike the rail transportation of the entire country was materially deranged, entailing large additional costs to the carriers in their endeavor to meet the public's requirements for transportation. In the case of your Company the abnormal costs so incurred did much to offset the gratifying results of the operations of the first six months of the year, and it is estimated that on a seasonal basis the loss to the Company in net railway operating income by reason of the strike of the shop crafts was not less than $7,500,000.

The revenues of the Company were also affected by a general reduction of ten percent in freight rates ordered by the Interstate Commerce Commission, effective July 1, 1922. This reduction was partially offset by reductions in wages of employes of certain branches of the service authorized by the United States Railroad Labor Board, also made effective July 1, 1922.

Referring to Table 1, it will be seen that notwithstanding the adverse circumstances of the year there was an increase in gross freight revenues of $2,744,586.19 or 1.75 per cent. when compared with the year 1921. Coincident with the increase in revenues there was an increase in revenue freight carried of 6,992,030 tons or 9.77 per cent. over the preceding year, the greater part of which increase was from manufactured products. That the percentage of increase in revenues did not equal the percentage of increase in tons carried is due to the reduction in freight rates, effective July 1, 1922, and to the shorter average distance each ton was carried. Freight traffic statistics will be found in Tables 10 and 11, and Table 14.

Passenger revenue decreased $2,626,572.22 or 8.93 per cent. in comparison with 1921, directly attributable to the decline in passenger travel as indicated by the fact that there were 3,212,171 or 15.15 per cent. fewer passengers carried than in 1921, in fact, there were fewer passengers carried than in any year since 1907. Passenger traffic statistics will be found in Tables 12 and 13.

Express revenue increased $2,371,822.87 or 113.17 per cent., of which amount $1,399,974.19 represents increased allowances on business of the year 1922 and $977,727.12 represents adjustments of allowances for previous years.

All other revenues decreased $724,520.37 or 67.14 per cent. due principally to less demurrage charges collected, indicating prompter release of equipment, and also to decreases in incidental and miscellaneous revenues.

Total revenues for the year 1922 were $200,843,169.67, of which 79.42 per cent. was from freight; 13.34 per cent. from passengers; 1.29 per cent. from mail; 2.23 per cent. from express, and 3.72 per cent. from all other sources. There was an increase in gross revenue of $1,765,316.47, or 0.89 per cent. as compared with the year 1921.

Expenditures for Maintenance of Way and Structures decreased $1,398,649.73 or 5.66 per cent. Expenditures for Maintenance of Equipment, due largely to the strike of the shop crafts, increased $3,043,931.83 or 6.71 per cent. when compared with the year 1921. The total expenditures for maintenance of property during the year was $71,765,309.17, and constituted 35.73 per cent. of all operating revenues.

Transportation expenses decreased $3,288,612.14 or 3.84 per cent. compared with the previous year and constituted 41.03 per cent. of total operating revenues as compared with 43.05 per cent. of operating revenues for the

TABLE 2—Concluded. GENERAL BALANCE SHEET. YEAR ENDED DECEMBER 31, 1921.

LIABILITIES

	OUTSTANDING.	HELD BY OR FOR COMPANY.	TOTAL ISSUED.	COMPARISON WITH DECEMBER 31, 1921.
STOCK:				
Capital Stock:				
Common Stock	$151,945,428.54	$372,039.46	$152,317,468.00	
Preferred Stock	58,863,180.95	1,136,819.05	60,000,000.00	
Separate Stock—Washington Branch (per contra)	.....	1,650,000.00	1,650,000.00	
Total Capital Stock	$210,808,609.49	$3,158,858.51	$213,967,468.00	.....
LONG TERM DEBT:				
Funded Debt Unmatured:				
Equipment Obligations	$44,690,706.69	$19,100.00	$44,709,806.69	
Mortgage Bonds	297,662,335.00	58,712,895.00	356,375,230.00	
Collateral Trust Bonds	93,976,290.90	7,721,210.00	101,697,500.00	
Miscellaneous Obligations	79,763,405.35	.....	79,763,405.35	
Total Long Term Debt	$516,092,737.04	$66,453,205.00	$582,545,942.04	I $8,964,852.82
CAPITAL STOCK and FUNDED DEBT of LEASED LINES (per contra):				
Dayton and Michigan R. R. Co., Common Stock	$2,396,950.00	$5,000.00	$2,401,950.00	
Dayton and Michigan R. R. Co., Preferred Stock	1,211,250.00	.....	1,211,250.00	
Dayton and Michigan R. R. Co., First Mortgage Bonds	2,728,000.00	.....	2,728,000.00	
Home Avenue R'y Co., Capital Stock	100,000.00	.....	100,000.00	
Total Capitalized Leaseholds	$6,436,200.00	$5,000.00	$6,441,200.00	.....
Total Capital Obligations and Capitalized Leaseholds	$733,337,546.53	$69,617,063.51	$802,954,610.04	I $8,964,852.82
CURRENT LIABILITIES:				
Loans and Bills Payable			$4,300,000.00	
Traffic and Car Service Balances Payable			6,128,738.14	
Audited Accounts and Wages Payable			18,108,892.67	
Miscellaneous Accounts Payable			4,144,099.73	
Interest Matured Unpaid			3,650,931.81	
Dividends Matured Unpaid			56,121.39	
Funded Debt Matured Unpaid			39,800.00	
Unmatured Dividends Declared			1,177,263.62	
Unmatured Interest Accrued			3,823,040.15	
Unmatured Rents Accrued			33,281.30	
Other Current Liabilities			61,667.35	
Total Current Liabilities			$41,523,836.16	D $229,921.24
DEFERRED LIABILITIES:				
Liability for Provident Funds			$2,891,193.06	
Other Deferred Liabilities			1,641,281.85	
United States Railroad Administration			81,608,980.03	
Total Deferred Liabilities			$86,141,454.94	D $2,668,723.38
UNADJUSTED CREDITS:				
Tax Liability			$301,079.21	
Insurance Reserve			1,456,613.20	
Operating Reserves			5,017,145.71	
Accrued Depreciation—Equipment			42,656,929.67	
Other Unadjusted Credits (interdepartmental accounts in process of adjustment)			3,994,860.70	
Total Unadjusted Credits			$53,426,628.49	I $4,091,990.67
CORPORATE SURPLUS:				
Additions to Property Through Income and Surplus			$20,736,232.78	
Sinking Fund Reserves			180,612.86	
PROFIT AND LOSS:				
Balance			20,015,285.03	
Total Corporate Surplus			$40,932,130.67	I $1,815,840.53
Grand Total			$1,024,978,660.30	I $11,974,039.40

I indicates increase.
D indicates decrease.

The following securities bear the endorsement of The Baltimore and Ohio Railroad Company, jointly with other Companies, viz.: Kentucky and Indiana Terminal Railroad Company, 1st Mortgage Sterling Bonds, $6,282,780.60; Richmond-Washington Company, 1st Mortgage Bonds $10,000,000.00; Washington Terminal Company, 1st Mortgage Bonds, $12,000,000.00. The Company, through its subsidiary, The Toledo and Cincinnati Railroad Company, guarantees $2,728,000.00 Consolidated First Mortgage Bonds of The Dayton and Michigan Railroad Company.

The above General Balance Sheet presents an accurate statement of the accounts of the Company as of December 31, 1922.

J. J. EKIN, *Comptroller.*

year 1921. There was a small decrease in the number of train miles and in locomotive miles other than switching. Loaded car miles increased 48,947,189 miles or 10.35 per cent., while empty car miles decreased 58,060,664 miles or 17.19 per cent. as compared with the year 1921.

Traffic expenses for 1922 were $255,417.15 or 7.73 per cent. in excess of 1921, due principally to the extension of off-line agencies. General expenses were $749,305.64 or 11.69 per cent. less than in 1921, due mainly to reduction in salaries of officers and clerks, and also to reduction in forces and expenses of those engaged in the work of Federal valuation. All other expenses for 1922 increased $86,499.94 or 5.61 per cent.

Total Railway Operating Expenses for 1922 were $165,021,374.40, a decrease when compared with 1921 of $2,050,718.59 or 1.23 per cent. The ratio of operating expenses to operating revenues was 82.61 per cent. in 1922 compared with 83.92 per cent. in 1921. Details of operating expenses will be found in Table 5.

Railway Tax Accruals for the year were $6,769,093.26, a decrease of $517,169.00 or 7.10 per cent. compared with 1921, due to decreases in Federal income and capital stock taxes and to adjustment of over accruals in previous years.

Net charges for equipment rents in 1922 increased $2,158,430.13 or 119.98 per cent. over 1921. This increase is due to some extent to the increase in business, but much the larger part of the increase accrued during the latter part of the year and is attributable to the strike of the shop crafts.

Joint facility net rental charges increased $337,282.14, or 35.99 per cent. over 1921, occasioned by increased rentals paid for facilities of other carriers.

Net Railway Operating Income as defined in the Transportation Act of 1920 was $23,735,005.21 for 1922, being equivalent to 3.29 per cent. on the investment of $721,374,255.33 in property used in transportation service, as compared with a return of 5.75 per cent. which the Interstate Commerce Commission has determined to be reasonable for the period under review. The Net Railway Operating Income for the year was $1,793,308.80 or 8.17 per cent. in excess of the year 1921.

Other Corporate Income for the year decreased $3,937,955.40 when compared with 1921, but this decrease is entirely due to the inclusion in Miscellaneous Income in 1921, under instructions of the Interstate Commerce Commission, of $4,275,419.21 representing amounts found to relate to the period March 1 to August 31, 1920, and chargeable to the United States under the Transportation Act of 1920.

The relatively small decrease of $131,128.62 in Deductions from Corporate Income is occasioned by normal fluctuations in the items comprising that grouping.

The Net Corporate Income for the year was $4,375,373.29, which amount was transferred to Profit and Loss account. The Company's obligation with respect to the $35,000,000 loan agreement of July 1, 1919, was met by the appropriation of $3,500,000 and applied in the retirement at maturity of outstanding long term debt. Out of the surplus income accruing since July 1, 1919, the Company has set apart $12,250,000 in accordance with the terms of the loan agreement of July 1, 1919, and but $5,250,000 remains to be set apart to complete the Company's obligation with respect to the agreement referred to.

Dividends on the preferred stock of the Company at the customary rate of four percent. were declared.

SETTLEMENT WITH THE UNITED STATES.

Settlement with the Director General of Railroads for the use and operation of the Company's transportation property and of its subsidiaries during Federal Control was reached on July 27, 1922. The Director General is still engaged in auditing the transactions coming to book subsequent to Federal Control, but pertaining to that period. It is expected that the adjustment of accounts will be completed shortly when it will be possible to make a statement of the final results and enable the clearance from the balance sheet of the accounts with the United States Railroad Administration under the heading of "Deferred Assets" and "Deferred Liabilities."

Since the close of the year the Company has reached with the Interstate Commerce Commission a basis for settlement covering the so-called Guaranty Period, March 1 to August 31, 1920, under the provisions of the Transportation Act of 1920, and it will be possible to include in the next annual report a complete statement of the results of this settlement.

FEDERAL VALUATION.

The work required of your Company under the Federal Valuation Act of March 1, 1913, was continued and at the close of the year was more than 95 per cent. completed. Practically all of the field work has been done and maps, schedules, inventories and other information required to be compiled are substantially completed. Further procedure must now await the receipt from the Government of the underlying reports and the tentative valuation, which, owing to the reduced force of the Interstate Commerce Commission, are not expected to be available during the current year.

To December 31, 1922, the amount expended by the Baltimore and Ohio System upon the valuation work called for under the act above mentioned amounted to $3,172,170. The employes assigned to this work are being gradually reduced, but it will be necessary to maintain a minimum force pending final valuation and a small permanent group will be required in order to maintain the current valuation records as prescribed by the Commission.

ADDITIONS AND BETTERMENTS TO ROAD.

Very little construction work was undertaken during the year. The total amount expended for additions and betterments to road was $1,551,285.72, the character of which will be found set forth in Table 4.

ADDITIONS AND BETTERMENTS TO EQUIPMENT.

During the year the following equipment was acquired by the Company:

30	Locomotives.
3	Passenger Train Cars.
6,006	Freight Train Cars.
39	Work Equipment.
	Miscellaneous Equipment.
with a value of	$11,488,300.61

and during the same period the following equipment was retired from service:

39	Locomotives.
10	Passenger Train Cars.
4,662	Freight Train Cars.
498	Work Equipment.
	Miscellaneous Equipment.
having a book value of	$4,570,047.21
and there was a reduction in value of equipment changed from class to class of	30,967.66
	4,601,014.87
Making total net increase in value of equipment owned	$6,887,285.74

There was a net increase in tractive power of locomotives acquired over locomotives retired of 963,439 lbs. and an increase in tonnage capacity of freight cars acquired over freight cars retired of 80,997 tons.

SUBSIDIARY COMPANIES AND OPERATIONS.

Beginning January 1, 1922, the operations of the Morgantown and Kingwood Railroad Company, which had theretofore been separately operated, were included in the operations of the parent Company. For purposes of comparison the figures shown throughout this report for the year 1921 have been restated to include the Morgantown and Kingwood Railroad Company.

On November 9, 1922, the Company with the approval of the Interstate Commerce Commission acquired the entire capital stock of the Indian Creek and Northern Railroad Company, a newly constructed line in West Virginia affording access to large coal developments and to a large undeveloped territory of high grade bituminous coal.

Income accounts for the year 1922 of the several separately operated railroad subsidiaries are shown in Table 19. The net profit or loss of these properties is absorbed by the parent company and included in its income account, Table 1.

RELIEF DEPARTMENT—PENSIONS.

The operations of the Relief and Savings Features of the Relief Department, conducted for the benefit of those employes desiring to avail of its privileges, are shown in Table 16.

The number of employes in the service of the Company December 31, 1922, was 61,950, of which 48,853 were members of the Relief Department.

Payments by the Company to retired employes are made from month to month and constitute a special roll. There was an increase of 52 pensioners, making a total of 1,233 pensioners on the roll at the end of the year. The total payment for pensions during the year was $407,786.74, an increase of $27,773.14 over the previous year. The total payments for pensions since the inception of the Pension Feature, October 1, 1884, has been $5,038,103.29.

There were 35,463 shareholders of the Company on record December 31, 1922.

The Board records its appreciation and thanks to the officers and employes who served the Company faithfully and efficiently during the trying periods of the year.

By order of the Board,
DANIEL WILLARD, President.

TABLE 1

CORPORATE INCOME AND SURPLUS ACCOUNTS.

Year Ended December 31, 1922, in Comparison with Year Ended December 31, 1921.

THE BALTIMORE AND OHIO RAILROAD COMPANY.

Corporate Income Account.	Year 1922.	Year 1921.	Increase or Decrease.
Average Miles Operated	5,212.05	5,235.08	*23.03
Railway Operating Revenues:			
Freight	$159,506,624.69	$156,762,038.50	$2,744,586.19
Passenger	26,801,741.73	29,428,313.95	*2,626,572.22
Mail	2,593,804.83	2,765,813.02	*172,008.19
Express	4,467,546.23	2,095,723.36	2,371,822.87
Other Transportation Revenue	3,129,144.29	2,971,456.86	157,687.43
Miscellaneous Revenue	4,344,307.90	5,054,507.51	*710,199.51
Total Railway Operating Revenue	$200,843,169.67	$199,077,853.20	$1,765,316.47
Railway Operating Expenses:			
Maintenance of Way and Structures	$23,325,886.80	$24,724,536.53	*$1,398,649.73
Maintenance of Equipment	48,439,422.37	45,395,490.54	3,043,931.83
Traffic	3,560,796.63	3,305,379.48	255,417.15
Transportation	82,408,878.33	85,697,490.47	*3,288,612.14
Miscellaneous Operations	1,647,881.02	1,579,430.69	68,450.33
General	5,658,981.82	6,408,287.46	*749,305.64
*Transportation for Investment—Credit	*20,472.57	*38,522.18	18,049.61
Total Railway Operating Expenses	$165,021,374.40	$167,072,092.99	*$2,050,718.59
Net Revenue from Railway Operations	$35,821,795.27	$32,005,760.21	$3,816,035.06
Ratio of Operating Expenses to Operating Revenues	82.16%	83.92%	*1.76%
Other Operating Charges:			
Railway Tax Accruals	$6,769,093.26	$7,286,262.26	*$517,169.00
Uncollectible Railway Revenues	85,821.61	41,638.62	44,182.99
Equipment Rents—Net Debit	3,957,430.54	1,799,000.41	2,158,430.13
Joint Facility Rents—Net Debit	1,274,444.65	937,162.51	337,282.14
Total Other Operating Charges	$12,086,790.06	$10,064,063.80	$2,022,726.26
Net Railway Operating Income as defined in the Transportation Act of 1920	$23,735,005.21	$21,941,696.41	$1,793,308.80
Other Corporate Income:			
Income from Lease of Road	$17,895.46	$17,427.43	$468.03
Miscellaneous Rent Income	1,068,200.18	1,088,161.15	*19,960.97
Miscellaneous Nonoperating Physical Property	121,454.97	147,292.93	*25,837.96
Separately Operated Properties—Profit	423,242.61	446,926.91	*23,684.30
Dividend Income	1,886,367.50	1,907,299.00	*20,931.50

Income from Funded Securities	1,758,486.86	1,665,521.20	92,965.66
Income from Unfunded Securities and Accounts	493,864.89	489,644.78	4,220.11
Income from Sinking and Other Reserve Funds	395,818.08	70,272.55	325,545.53
Miscellaneous Income	21,801.84	4,292,541.84	*4,270,740.00
Total Other Corporate Income	$6,187,132.39	$10,125,087.79	*$3,937,955.40
Gross Corporate Income	$29,922,137.60	$32,066,784.20	*$2,144,646.60
Deductions from Gross Corporate Income:			
Rent for Leased Roads	$283,213.71	$329,770.23	*$46,556.52
Miscellaneous Rents	432,855.08	479,547.62	*46,692.54
Miscellaneous Tax Accruals	271,835.21	247,752.21	24,083.00
Separately Operated Properties—Loss	1,186,411.02	1,152,077.73	34,333.29
Interest on Funded Debt	22,810,615.53	22,761,052.85	49,562.68
Interest on Unfunded Debt	439,448.19	583,148.26	*143,700.07
Miscellaneous Income Charges	122,385.57	124,544.03	*2,158.46
Total Deductions from Gross Corporate Income	$25,546,764.31	$25,677,892.93	*$131,128.62
Net Corporate Income	$4,375,373.29	$6,388,891.27	*$2,013,517.98

*Decrease.

TABLE 1—Concluded.

CORPORATE INCOME AND SURPLUS ACCOUNTS.

Year Ended December 31, 1922, in Comparison with Year Ended December 31, 1921.

CORPORATE SURPLUS ACCOUNT.

Profit and Loss Account:		
Credit Balance, December 31, 1921		$21,911,582.56
Net Corporate Income for Year 1922	$4,375,373.29	
Miscellaneous Adjustment—Net Credit	7,337.06	4,382,710.35
Total		$26,294,292.91
Appropriations During Year 1922:		
Income applied to Sinking and Other Reserve Funds	$424,480.64	
Increase transferred to "Additions to Property Through Income and Surplus"	3,500,000.00	
Dividends on Preferred Stock at 4 per cent. per annum	2,354,527.24	6,279,007.88
Credit Balance December 31, 1922		$20,015,285.03
Additions to Property Through Income and Surplus:		
Credit Balance Dec. 31, 1921	$17,036,266.44	
Income appropriated during the year 1922	$3,500,000.00	
Miscellaneous	199,966.34	3,699,966.34
Credit Balance December 31, 1922		20,736,232.78
Sinking Fund Reserves		180,612.86
Total Corporate Surplus, Credit Balance Dec. 31, 1922		$40,932,130.67

[ADVERTISEMENT]

(*Continued from page 362*)

equipment, the total purchase price of which is to be approximately $5,345,280. This issue has been authorized by the Interstate Commerce Commission.

OSAGE COUNTY & SANTA FE.—*Acquisition by Lease Approved.*—The Interstate Commerce Commission has authorized the Atchison, Topeka & Santa Fe to acquire control of this property by leasing it.

PENNSYLVANIA COMPANY.—*Annual Report.*—The annual report for the year ended December 31, 1922 shows a net income of $6,142,059 as compared with $3,573,492 in 1921. The income statement follows in brief:

	1922	Increase or Decrease
Gross income	$8,329,213	$402,407
Total deductions from gross income	2,187,154	—2,166,160
Net income	$6,142,059	$2,568,567
Income applied to sinking and other reserve funds	49,934	—521,401
Income appropriated for investment in physical property	118,948	.....
Dividend appropriations of income (6 per cent)	4,800,000	.....
Balance transferred	$1,173,177	$3,089,968

PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS.—*Annual Report.*—The annual report for the year ended December 31, 1922 shows a net income of $3,398,748 as compared with $6,484,918 in 1921. The income account follows in brief:

	1922	Increase or Decrease
Mileage	1,857	0.30
Rental received from lease of road	$9,815,963	—$139,866
Gross income	9,837,256	—3,671,806
Total deductions from gross income	6,438,508	—585,636
Net income	$3,398,748	—$3,086,170
Dividend of 2 per cent paid Aug. 15, 1922	1,694,242	.....
Dividend of 2 per cent paid Jan. 20, 1923	1,694,258	16
Balance transferred	$10,248	—$3,086,186

SOUTHERN.—*Authorized to Pay Interest on City Bonds.*—This company has been authorized by the Interstate Commerce Commission to assume as lessee, obligation and liability, as rental for a passenger station and appurtenances at Greensboro, N. C., an annual sum sufficient to pay the interest on $1,300,000 of 5 per cent bonds to be issued by the city and such further sum as may be necessary to provide for a sinking fund for their redemption at maturity.

ST. LOUIS-SAN FRANCISCO.—*Authorized to Acquire Control.*—The Interstate Commerce Commission has authorized this company to acquire control of the Miami Mineral Belt by purchase of its capital stock.

Pays Contingent Interest.—The St. Louis-San Francisco has declared the 3 per cent semi-annual interest on its adjustment mortgage bonds and the 6 per cent annual interest on its income bonds, both payable October 1.

Dividends Declared

Buffalo & Susquehanna.—Common, 1¾ per cent, quarterly; common, extra, 2½ per cent; both payable September 28 to holders of record September 15.

Erie & Pittsburgh.—1¾ per cent, quarterly, payable September 10 to holders of record August 13.

Missouri, Kansas, Texas.—2½ per cent, semi-annually, on 5 per cent series A adjustment mortgage bonds for six months ending June 30, 1923, payable October 1.

New Orleans & Northeastern.—6 per cent, payable August 23 to holders of record August 16.

New Orleans, Texas & Pacific.—1¾ per cent, quarterly, payable September 1 to holders of record August 24.

Trend of Railway Stock and Bond Prices

	August 21	Last Week	Last Year
Average price of 20 representative railway stocks	59.73	58.68	73.64
Average price of 20 representative railway bonds	82.60	82.49	89.67

THE ATCHISON, TOPEKA & SANTA FE has offered to deposit money in the banks of Stanton, Morton, Grant, Stevens, Haskill, Finney, Scott, Lane, Gray, Ness, Hodgman, and Ford counties in southwestern Kansas to be lent to farmers for seed wheat purchases. The Santa Fe offers to deposit the money at 4 per cent and stipulates that the banks shall not charge the farmers more than 8 per cent. The purpose of the offer is to assist the farmers in good standing at the banks in obtaining money for seed wheat. If successful the plan will be extended to Oklahoma banks.

Underwood & Underwood

The Harbor of Naples, Italy

Railway Officers

Executive

S. A. Wilder, assistant to the general manager of the Northern Pacific with headquarters at St. Paul, Minn., has been promoted to assistant to vice-president in charge of operation with the same headquarters. Mr. Wilder will have charge of labor matters for the entire system.

Operating

E. Hinrichs has been appointed superintendent of car service of the Western Fruit Express Company, with headquarters at Washington, D. C.

C. J. Cavanagh has been appointed trainmaster of the Northern Division of the Chicago Great Western, with headquarters at St. Paul, Minn., succeeding **F. M. Corbett,** resigned.

W. S. Murphy has been appointed general time supervisor of the Canadian National with jurisdiction over all steam lines, with headquarters at Montreal. It will be his duty to reorganize the timekeeping service, supervise the same, and take up with the proper territorial officers any matters relating thereto. He will also give special attention to matters relating to economical operation.

Ralph Peters, Jr., assistant superintendent of the Long Island, has been promoted to superintendent, succeeding W. E. Canning, deceased. Mr. Peters was born on May 5, 1887, in Cincinnati, Ohio, and was graduated from Princeton University in 1908 with the degree of civil engineer. Shortly after his graduation, Mr. Peters entered the service of the Long Island as a draftsman in the engineering department. In 1910 he became a clerk in the trainmaster's office and a few months thereafter was advanced to assistant engineer in the construction department. Four years later he was promoted to office engineer for the construction and maintenance of way departments and held that position until 1916 when he was assigned to the transportation department for special work with the title of special engineer. In 1917 he was promoted to assistant trainmaster with special duties, involving the operation at the various freight terminals in the road's Western territory and a few months later was promoted to assistant superintendent in charge of the Bay Ridge division. Shortly thereafter his duties were extended to include passenger operation in the electrified zone. He spent a year with the American Expeditionary Forces as a lieutenant in the transportation corps and in 1919 returned to his former position with the Long Island. At the end of federal control he was promoted to superintendent of passenger transportation. Upon a change in organization in 1922, Mr. Peters was appointed assistant superintendent in charge of both passenger and freight train operation.

Traffic

C. A. Small has been appointed commercial agent of the Maine Central, with headquarters at Lewiston, Me., and **J. E. O'Donnell** to a similar position at Bangor, Me.

Mechanical

H. W. Johnson has been appointed superintendent of motive power and rolling stock of the Minneapolis & St. Louis with headquarters at Minneapolis, Minn., succeeding Wm. Gemlo, resigned. **Lee Chapman** has been appointed assistant superintendent of motive power and rolling stock and **Leo Burke** has been appointed master car builder, both with the same headquarters. **C. B. Rogers** has been appointed master mechanic at Marshalltown, Ia., succeeding L. D. Brown, resigned. The position of master mechanic at Minneapolis has been abolished and Mr. Rogers' jurisdiction will extend over the entire system.

Engineering, Maintenance of Way and Signaling

G. E. Moberly, assistant division engineer of the Utah division of the Oregon Short Line, with headquarters at Pocatello, Idaho, has been promoted to division engineer, with the same headquarters, succeeding R. B. Reasoner, deceased.

Frederick Mears, chairman and chief engineer of the Alaskan Engineering Commission, with headquarters at Anchorage, Alaska, has been appointed chief engineer of the St. Paul Union Depot Company, with headquarters at St. Paul, Minn., succeeding **W. C. Armstrong,** whose death on June 12 was reported in the *Railway Age* of June 16. Mr. Mears was born on May 25, 1878, in Omaha, Nebr., and graduated from the Shattuck school at Faribault, Minn., in 1897, and from the United States College at Fort Leavenworth, Kansas, in 1905. He entered railway service in June, 1897, on the survey and construction of the Park Rapids extension of the Great Northern, and was later on the location survey of the Coon Creek cut-off and assistant engineer of the Kootenai Valley railroad. In July, 1905, he was appointed assistant engineer of the Chicago, Rock Island & Pacific, with headquarters at Fordyce, Ark. In October of that year, he entered the service of the United States Army and in May, 1906, was appointed assistant engineer of the Isthmian canal commission at Panama. He was promoted to resident engineer of the Panama Railroad in May, 1907, and was promoted to chief engineer in December, 1909. In addition to his duties as chief engineer, he served as general superintendent from 1913 to 1915. Mr. Mears was appointed a member of the Alaskan Engineering Commission in May, 1914. From February, 1918, to May, 1919, he was in the army service in the United States and France as assistant general manager and general manager of the railroad department. In August, 1919, he returned to the Alaskan Engineering Commission as chairman and chief engineer in charge of railroad operation and construction in Alaska.

F. Mears

Purchasing and Stores

Eugene S. Marsh has been appointed general storekeeper of the Wheeling & Lake Erie, with headquarters at Brewster, Ohio, succeeding William Hunt, resigned.

Obituary

M. S. Montgomery, fuel supervisor of the Northern Pacific with headquarters at St. Paul, Minn., died in that city on August 8.

George A. Nolpe, grand vice-president of the Brotherhood of Railway Carmen of America, died in Cincinnati, Ohio, on August 11.

D. M. Goodwyn, freight traffic manager of the Louisville & Nashville, with headquarters at Louisville, Ky., died at Epworth, Mich., on August 6.

Archibald Ritchie, assistant treasurer of the Canadian National, with headquarters at Montreal, died in that city on August 12. Mr. Ritchie was born in Point St. Charles, Montreal, in 1880, and entered railway service in 1894 as a clerk in the audit department of the Grand Trunk. A year later he was transferred to the treasurer's department. In 1906, Mr. Ritchie was promoted to paymaster and held that position until the amalgamation of the Grand Trunk with the Canadian National when he was appointed assistant treasurer.